AEROMAX PLUS

Air Source heat Pump
Installation and Maintenance Manual

Model numbers:
KHP0041: 4kW Heat Pump
KHP0038: 6kW Heat Pump
KHP0039: 8kW Heat Pump
KHP0040: 12kW Heat Pump
KHP0042: 15kW Heat Pump

Kingspan Heat Pumps

A9317D

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INSTALLATION

- SITING THE UNIT
- WATER CONNECTIONS
- ELECTRICAL CONNECTIONS
- CONTROL WIRING (OPTIONAL)
- POWER WIRING
- FLUSHING WATER AND AIR
- CHECKING FOR WATER LEAKS
- CONFIGURING & CHECKING THE SYSTEM

Code	Description
KHP0041	AEROMAX PLUS 4KW
KHP0038	AEROMAX PLUS 6KW
KHP0039	AEROMAX PLUS 8KW
KHP0040	AEROMAX PLUS 12KW
KHP0042	AEROMAX PLUS 15KW

Introduction

The information in this manual is to provide general assistance in the selection of equipment. The responsibility for the specification of the equipment must however remain that of the installer and any consultants or designers concerned with the installation, specification or design.

Any water distribution and central heating installation must comply with the relevant recommendation of the current version of the Regulations and British Standards listed below:

Building Regulations
I.E.E. Requirements for Electrical Installations (BS7671)
Water Regulations Manual Handling Operations Regulations

British Standards BS6798, BS5449, BS5546, BS5440:1, BS5440:2, CP331:3, BS6700, BS7593 and BS7671. Health and Safety Document No 635.

When installing unvented hot water systems section G3 of the Building Regulations should be adhered to. An annual inspection would also be required to ensure safe, long term operation.

Please note: Kingspan Renewables do not accept any responsibility for matters of specification, design or selection or for the effectiveness of an installation containing one of our products unless we have been specifically requested to do so.

Important Note - Included in the Aeromax Plus introduction pack is the Kingspan Renewables 2-year extended warranty registration card. Please use this card to register within 30 days of commissioning/occupation if new build, and ensure the homeowner benefits from the extended warranty. This needs to be completed by both the Approved Installer and the current homeowner (or a signature of developer is required if new build). The registration card is free post and is logged by our warranty department.

In the unlikely event of failure of the Aeromax Plus heat pump, return of the card ensures that the homeowner's warranty claim is dealt with efficiently.

All goods are sold subject to our Conditions of Sale (see Web site for details).

R-410A - General info

- This heat pump adopts the new HFC refrigerant (R410A) which does not destroy ozone layer.
- R-410A refrigerant operates at 50%-70% higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A refrigerant cylinders have a dip tube which allows liquid to flow out with the cylinder in a vertical position with the valve at the top.
- R-410A systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose in order to vaporize the liquid refrigerant before it enters in the unit.
- As for other HFC, R-410A refrigerant is only compatible with oils recommended by the compressor manufacturer.
- A vacuum pump is not enough to remove moisture from oil.
- Oils absorb moisture rapidly. Do not expose oil to atmosphere.
- Never open system to atmosphere while it is under vacuum.
- When the system must be opened for service, break vacuum with dry nitrogen and replace filter driers.
- Do not vent R-410A into the atmosphere.

Use this unit only for factory approved applications.

The capacity and unit code are stated on the nameplate data.

CAUTION:

- Do not leave the heat pump casing open to atmosphere any longer than the minimum required for installation.
- Oil in the compressor is extremely susceptible to moisture absorption.
- The maximum residual quantity of oil used for tubing is 40 mg/10m.

Introduction

Check List

The following check list has been prepared to assist you in understanding the differences from other types of heating systems you may have installed and help to understand and comply with all of the technical details contained within this document to ensure a successful installation.

System cleaning and Water Characteristics

- In the case of a new installation, or cleaning the circuit, it is necessary to perform a preventive cleaning of the system. In order to guarantee the good operation of the product, each time you clean the system, replace the water or add glycol, check that the liquid appears clear, without visible impurities and that the hardness is less than 20°f
- To help protect the heat pump from any heating system contamination; the system filter should be fitted internally on the return pipe.

Recommended system cleansers and inhibitors are listed below.

Fernox F3 System Cleanser
Fernox HP-15c combined antifreeze and inhibitor
Sentinel

All external connecting pipe work should be suitably insulated using Armaflex or similar.

Radiator System Circuit

- As the Aeromax Plus generates lower temperatures than a conventional boiler the radiators should have been designed to suit the lower mean temperature.
- The basic controls within the standard installers pack and the parameters on the heat pump are optimised for use on radiator systems.

Retrofit Situations

- The heat exchanger should be protected from particulate contaminates in the water circuit. The existing radiator circuit must be chemically cleaned and thoroughly flushed before installation when fitting in a retrofit situation.

NOTE For systems using under floor heating, boiler back up or clients wishing to alter the operating parameters of the unit; we recommend the purchase of our advanced controller. See manual for product code KHP0008.

NOTE It is the installer's responsibility to ensure correct sizing and provision of both the domestic circulating pump & any associated central heating expansion vessel

Installation Pack

The following items are required for the installation of the Aeromax Plus Air Source Heat Pump

Product Code	Description
KHP0029	4kW, 6kW & 8kW Installation Pack
KHP0030	12kW Installation Pack
KHP0026	15kW Installation Pack

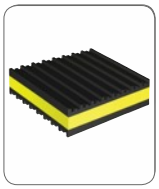
Pack Contents

2 x 750mm flexible hoses including 90° elbow, pre-insulated.

1 x System filter

W Plan diverter valve (heat pump specific)

Flush & fill ports (except 15kW)


Anti vibration pads

Immersion Heater Controller

Diagnostic indicator

Flow setter

Programmable room stat

7 day hot water programmer

2x Full bore isolating valve with lever arm

System Antifreeze / Inhibitor - Clear

Product Code	Description
KHP0023	1 x 25 litre system antifreeze inhibitor - Clear

1 x 25 litre clear - system antifreeze inhibitor

Safety procedures

Important safety information is displayed on the product and in this Manual. Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation.

Explanation of illustrated marks

Indicates prohibited items.	Indicates mandatory items.	Indicates cautions (including danger/warnings).

Explanation of indications

DANGER	WARNING	CAUTION
Indicates contents will cause death or serious injury if used incorrectly.	Indicates contents could cause death or serious injury if used incorrectly.	Indicates contents could cause an injury or damage to property, furniture or pets if the instructions are not followed carefully.

General notes

- Please ensure this manual is read thoroughly and kept for future reference.
- Before any repairs or maintenance are carried out an assessment of the potential risks must be undertaken, and appropriate measures taken to ensure the safety of all personnel.
- Do not attempt to repair, move, modify or re-install the unit on your own.
- Ideally a fully qualified competent MCS installer (such as those registered under the micro certification scheme) with prior knowledge of air to water heat pumps should be used to install and/or commission the unit.
- All of the manufacturing and packaging materials used for your new appliance are environmentally friendly and can be recycled.

LIABILITY The manufacturer declines any liability and invalidate the unit warranty for damage resulting from:

- Improper installation; including failure to follow instructions in the manuals.
- Modifications or errors in the electrical or refrigerant or water connections.
- Unapproved units coupling; including other manufacturers units.
- Use of the unit under condition other than those indicated.

Units handling

	Ensure adequate personal protective equipment is used.
	Inspect equipment for damage due to improper transportation or handling: file an immediate claim with the shipping company.
	Dispose of the packaging material in accordance with local requirements.
	When lifting the unit, absolutely do not use hooks inserted in the side handles, use special equipment (e.g. lifting devices, trolleys etc.).
	Do not step or put anything on the indoor/outdoor unit. It may cause an injury or damage the unit.
	Do not place containers filled with liquids or other objects onto the unit.

This appliance must not be used by persons (and children) with reduced physical, emotional or mental faculties or by persons with no experience or knowledge if they are not under the control of a person responsible for their safety, or if not instructed to the use of this appliance. Make sure that children do not play with the appliance.

Safety procedures

Unit installation

The installation must be carried out by a qualified installer.

DO NOT INSTALL IN A PLACE...

- Difficult to access for installation and maintenance.
- Too close to heat sources.
- That might increase the vibration of the unit.
- Which cannot bear the weight of the unit.
- Subject to a risk of exposure to a combustible gas.
- Exposed to oils and vapours.
- With particular environmental conditions ie windy location.

CHOOSE A PLACE...

- Where noise and discharged air do not disturb neighbours.
- Protected from strong winds.
- That allows for the clearances required.
- Which will not obstruct passageways or doors.
- With floor structure adequately strong to support unit weight and minimize vibration transmission.

Note...

Fix the unit with locally purchased bolts buried in the block. If the unit is installed in areas where heavy snowfalls may occur, it is necessary to raise its level at least 200mm above the usual snow level or alternatively to use the outdoor unit wall mounting bracket kit. See Kingspan optional extras such as the "snow feet" (Anti vibration foot KHP0044) recommended for exposed areas to help create an air gap under the unit.

Electrical connections

All field electrical connections are the responsibility of the installer.

DANGER
Electrical shock can cause severe personal injury or death. These operations are to be carried out by qualified personnel only.

WARNING

- This unit complies with Machinery Directive (2006/42/EC), electromagnetic compatibility (2004/108/EC) and pressure equipment (EEC/97/23) Directives.
- To avoid electric shock or fire make sure these operations are carried out by qualified personnel only.
- Ensure that national safety code requirements have been followed for the main supply circuit.
- Follow all current national safety code requirements.
- Ensure that a properly sized and connected ground wire is in place.
- Check that voltage and frequency of the mains power supply are those required; the available power must be adequate to operate any other possible appliances connected to the same line.
- Check that the impedance of the mains power supply is in conformance with the unit power input indicated in the rating plate of the unit.
- Make sure that properly sized disconnecting and safety switches are installed.
- The disconnection devices from the mains supply must allow full disconnection under the conditions provided for by overvoltage class III.

CAUTION

- Connect the connecting cable correctly. If the connecting cable is connected in a wrong way, electric parts may be damaged.
- Connection to the mains supply is of the Y type; therefore, the cable must only be replaced by a qualified technician in order to prevent any risk.
- Use the specified cables for wiring and connect them firmly to the terminals.

WARNING

- Be sure to provide grounding; inappropriate grounding may cause electric shock.
- Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.

DANGER:
Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.

FINAL CHECK

WARNING

- If refrigerant gas leaks out during the installation work, ventilate the room immediately.
- If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, poisonous gas is generated.

Contact the manufacturer if one of the following events takes place:

- hot or damaged power supply cable;
- unusual noise during operation;
- frequent operation of the protection devices;
- unusual smell (such as smell of burning).

Safety procedures

CAUTION

- Ensure adequate personal protective equipment is used.
- Extraordinary maintenance operations must be carried out by specially trained personnel.

Disconnect the mains power supply prior to any maintenance operations or prior to handling any internal parts of the unit.

CAUTION

- This equipment contains refrigerant that must be disposed of in a proper manner.
- When disposing of the unit after its operational life, remove it carefully.
- The unit must then be delivered to an appropriate disposal centre or to the original equipment dealer for proper environmentally compatible disposal.

Dimensions and Clearances

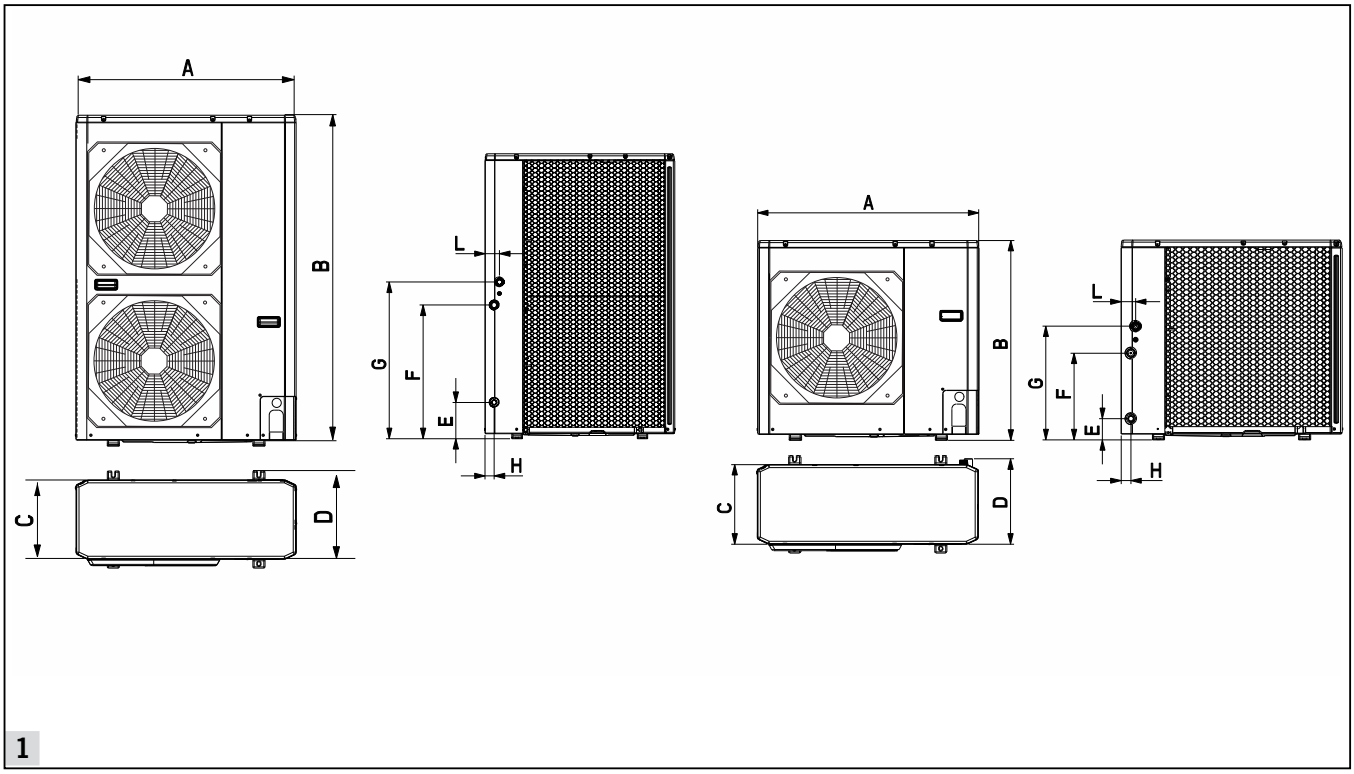
	A	B	C	D	E	F	G	H	L	weight
KHP0041	908	821	326	350	87	356	466	40	60	56
KHP0038	908	821	326	350	87	356	466	40	60	58
KHP0039	908	821	326	350	87	356	466	40	60	68
KHP0040	908	1363	326	350	174	640	750	44	69	99
KHP0042	908	1363	326	350	174	640	750	44	69	124

Minimum installation clearances in mm are shown in fig. 2 (single installation) and fig. 3 (serial installation)
Note: The height of the obstacle at both front and rear side should be lower than the height of the outdoor unit.

Specifications	**KHP0041**	**KHP0038**	**KHP0039**	**KHP0040**	**KHP0042**
	4kW	**6kW**	**8kW**	**12kW**	**15kW**
Data at Condition 1: A 7db/6wb W30/35 (EN14511)					
Nominal heating capacity kW	**4.1**	**5.8**	**7.2**	**11.9**	**14.5**
Power input kW	**1.01**	**1.37**	**1.82**	**3.01**	**3.57**
Current Input (A)	**4.35**	**5.95**	**7.91**	**13.1**	**15.5**
COP (kW/kW)	**4.05**	**4.24**	**3.95**	**3.94**	**4.06**
Eurovent class, heating	**A**	**A**	**B**	**B**	**A**
Data at Condition 2: A 7db/6wb W40/45 (EN14511)					
Nominal heating capacity (kW)	**3.9**	**5.8**	**7.4**	**12.9**	**14**
Power input (kW)	**1.22**	**1.90**	**2.32**	**4.26**	**4.36**
Current Input (A)	**5.3**	**8.26**	**10.1**	**18.5**	**18.9**
COP (kW/kW)	**3.2**	**3.06**	**3.18**	**3.03**	**3.21**
Eurovent class, heating	**A**	**B**	**B**	**B**	**A**
Water pressure drop, kPa (Condition 1)	**16**	**9.5**	**14.5**	**26**	**33**
Fan Power Input (kW) (Condition 1)	**0.09**	**0.09**	**0.099**	**0.191**	**0.19**
Fan Speed (RPM) (Condition 1)	**680**	**680**	**680**	**710 - 730**	**780-820**
Current Input (A) (Condition 1)	**0.65**	**0.65**	**0.85**	**1.63**	**1.18**
Sound power level, heating‡ dB(A)	**62**	**62**	**64**	**67**	**68**
Sound pressure level, heating‡ dB(A)	**42**	**42**	**44**	**47**	**48**
Nominal Flow Rate (l/min)	**12**	**16.8**	**19.8**	**34.8**	**41.4**
Nominal Flow Rate (l/min) (Radiators)	**8.0**	**9.8**	**10.8**	**21.0**	**31.7**
Minimum Flow Rate (l/min) (to operate flow switch)	**5**	**8**	**8**	**8**	**8**
Maximum Flow Rate (l/min)	**15**	**20**	**25**	**40**	**50**
Refrigerant Content (g) R410A	**1195**	**1350**	**1810**	**2450**	**3385**
Oil Type	**Ester Oil VG68**				
Compressor Type	**Rotary DC Inverter Technology**				
Net Water Volume (L)	**0.8**	**0.8**	**1**	**2.3**	**2.3**
Water Connections	**1" ISO228 (BSP) Male**				
Maximum Water Pressure (kPa)	**300**				
Product Category	**(EN14511) – Packaged Monobloc.**				

Above data applies to new, clean heat exchangers
Factory defult settings for heating are 55°C flow temp. To alter this you will be required to purchase the advanced controller KHP0008

Dimensions and Clearances



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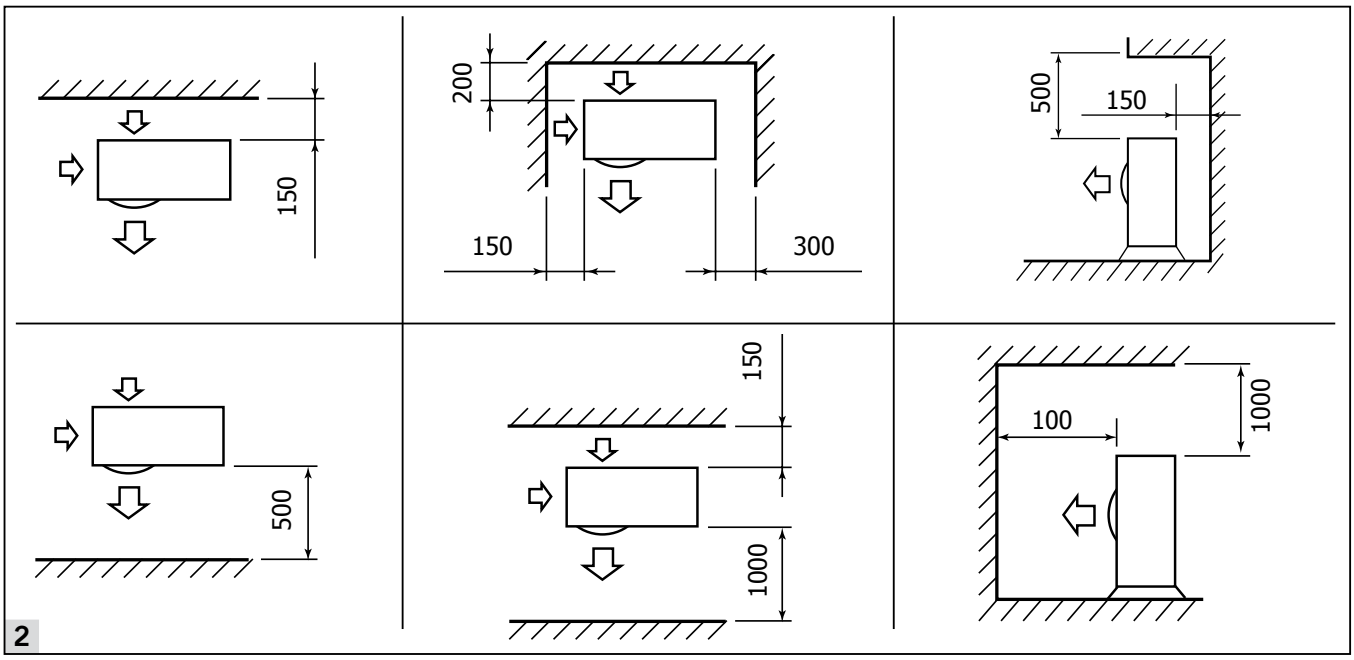

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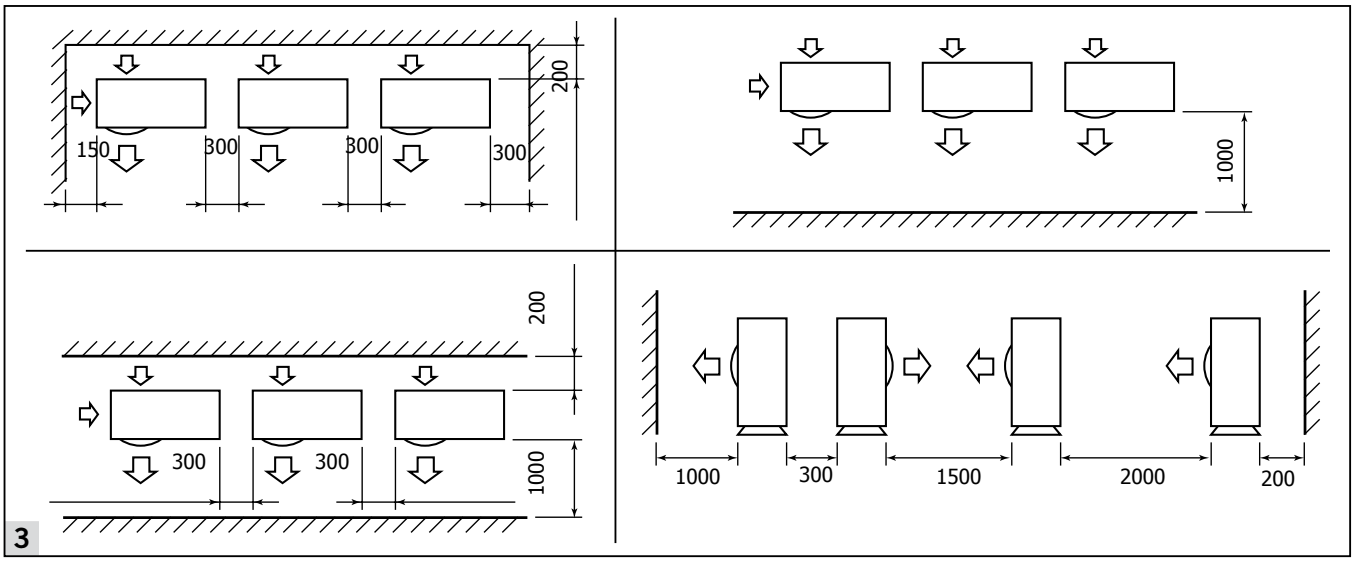

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Installation

Before installation, check strength and levelness of the base so that abnormal noise is not generated. According to the dimensions and clearances, fix the base firmly with the anchor bolts (Anchor bolt, nut: 4 off M10).

If the outdoor unit is installed in a very windy place, protect the fan with a wind protection screen and check that it works correctly.

Opening cable knockouts (Fig. 4)

There is a pre-cut part that can be removed for running wires. Do not remove the unit front panel for easier drilling of the knockouts. The pre-cut section of the sheet can be removed by punching the 3 connection points along the line first using a screwdriver and finally with your hands (See Fig. 4).

When the cable knockout is open, remove the burrs and fit the cable protective bush supplied with the unit for cable

How to remove the front panel (Fig. 5)

1.Remove screws of the front panel (See fig. 5).

2. Pull the front panel downward with the handle.

Drain hose and base pan knockouts (Fig. 6)

See fig. 6.
In case of draining through the drain hose, attach the drain nipple (A) and use the drain hose (Inner diam: 16mm) sold on the market. When there is a possibility of freezing of the drain in cold weather maintain a continuous downward slope in the drain pipe to prevent the drain becoming blocked by ice.

The drainage ability increases when knockout holes on the base pan are opened. (Open the knockout hole to outside using a hammer (B), etc.). Take care not to damage the evaporator coil when opening the knockout holes. We recommend that the knockout holes are opened for all UK & Ireland installations.

Operating limits (Fig. 10)

Operation in heating: See fig. 10
A- Outdoor air temperature (°C)
B- Outlet water temperature (°C)

Radiator Design / Defrost Cycle

The Aeromax Plus system typically requires at least one radiator (usually located in the same location as the room thermostat) to remain "open circuit" with no thermostatic radiator valve fitted.

The minimum design criteria to be employed by the installer is to allow 3 ltr per kW of nominal out of the heat pump.

For example:
8kW Aeromax Plus x 3ltr = 24 ltr of water to act as open loop.

Circulating Pump (Fig. 11)

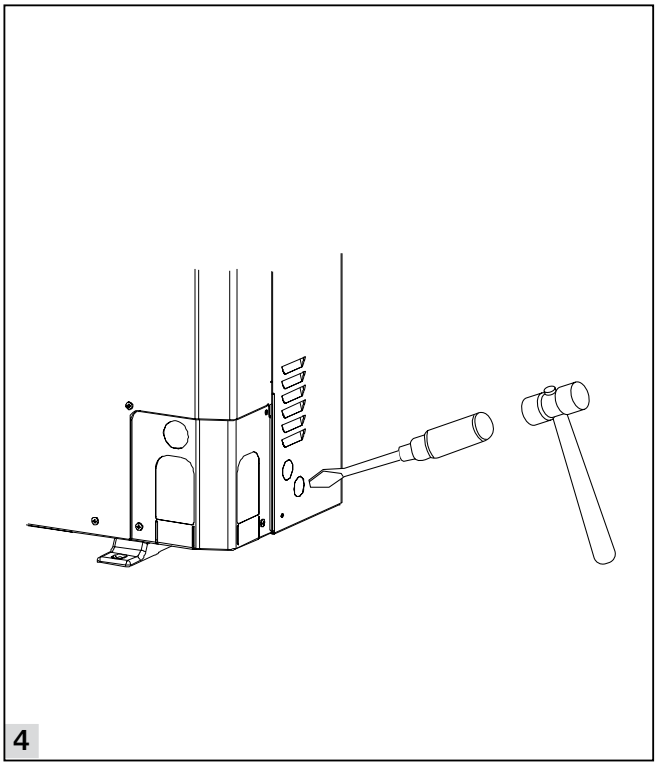
A circulating pump is not supplied as part of the Aeromax Plus installation pack. A suitable circulating pump must be specified based on the pressure loss in the system.

Pressure loss curves for the Aeromax Plus are shown in fig. 11.

Climatic Curve (Fig. 12)

To qualify as a Weather Compensated heat pump the Aeromax Plus is pre-programmed with a climatic curve. See fig. 12.

Care must be taken to ensure this curve is suitable for the application and heat emitters used. There are 12 pre-programmed climatic curves selectable using the User Comfort Interface KHP0008. A custom climatic curve can also be programmed.



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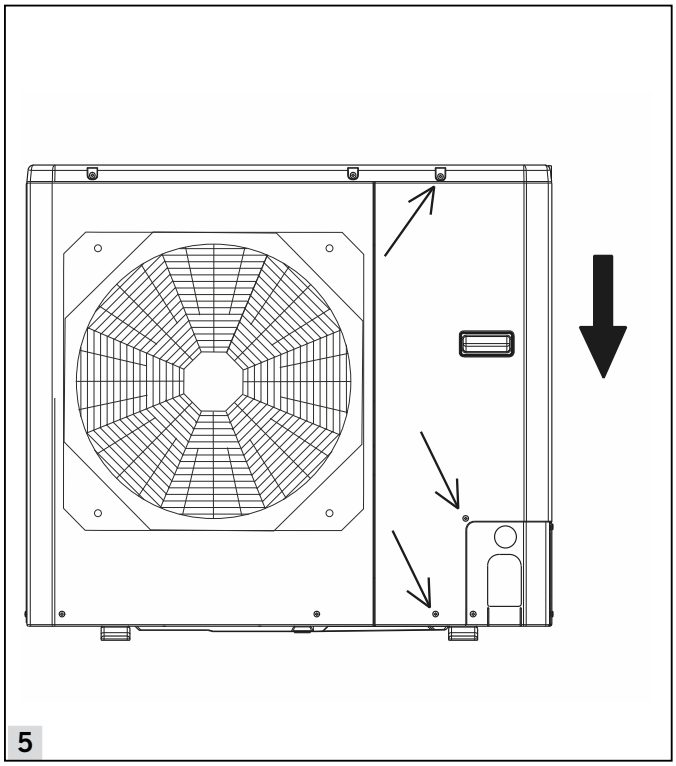

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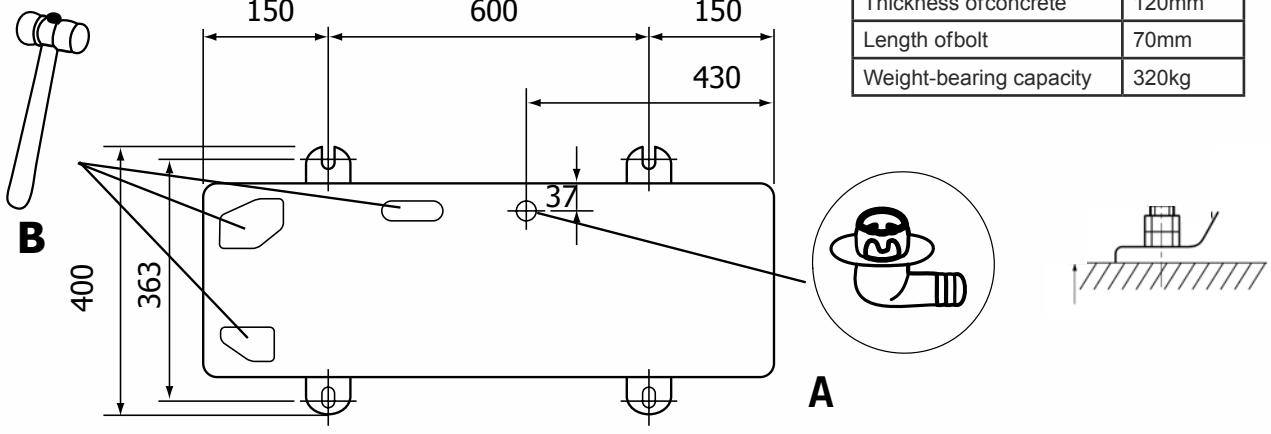
Foundation Specification	
Foundation bolt	M10 (3/8")
Thickness ofconcrete	120mm
Length ofbolt	70mm
Weight-bearing capacity	320kg



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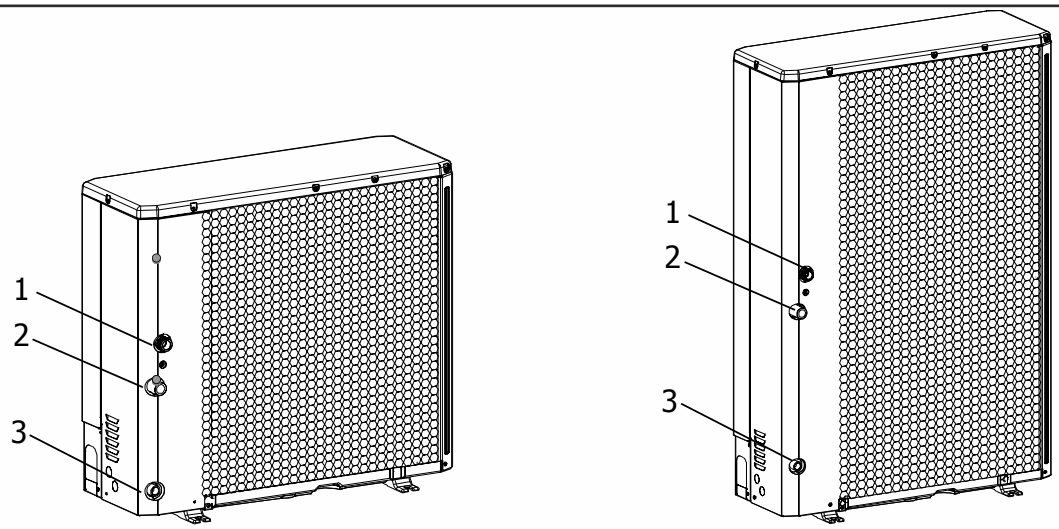

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Water Connections (Fig. 8/9/11)

Make the plate heat exchanger hydraulic connections with the necessary components, using material which will guarantee that the screwed joints are leak proof. The typical hydraulic circuit diagram shows a typical water circuit installation in an air conditioning system.

For an application with a water circuit, the following recommendations must be taken into account:

1. The pump must be fitted immediately before the heat exchanger and after the connection to the system return (unit without hydronic module).
2. It is advisable to install shut-off valves to allow isolation of the most important circuit components, as well as the heat exchanger itself.
   These valves (ball, globe or butterfly valves) should produce a minimum loss of charge when they are open.
3. Provide unit and system drains and vents at the lowest and highest system points respectively.
4. Install purges in the higher sections of the installation.
5. Flow setter should be installed after the pump on the return circuit. Leaving approx 200mm to avoid any turbulence from the pump
6. All piping must be adequately insulated and supported.

Installation of the following components is obligatory:

1. The presence of particles in the water can lead to obstructions in the heat exchanger. It is therefore necessary to protect the heat exchanger inlet with a filter or dirt separator. The filter mesh gauge must be at least 10 mesh/cm2.
2. After assembling the system, or repairing the circuit, the whole system must be thoroughly cleaned with special attention paid to the state of the filters.
3. Flow rate control is made by the control valve on the flowmeter/setter installed after the pump (see fig 9 item 11).
4. When water has to reach temperatures below 5°C, or the equipment is installed in areas subject to temperatures below 0°C, it is necessary to mix water with inhibited monopropolyne glycol in a suitable concentration.

System cleaning and Water Characteristics

In the case of a new installation, or cleaning the circuit, it is necessary to perform a preventive cleaning of the system. In order to guarantee the good operation of the product,each time you clean the system, replace the water or add glycol, check that the liquid appears clear, without visible impurities and that the hardness is less than 20 °f

Fig. 8 - Integrated water circuit

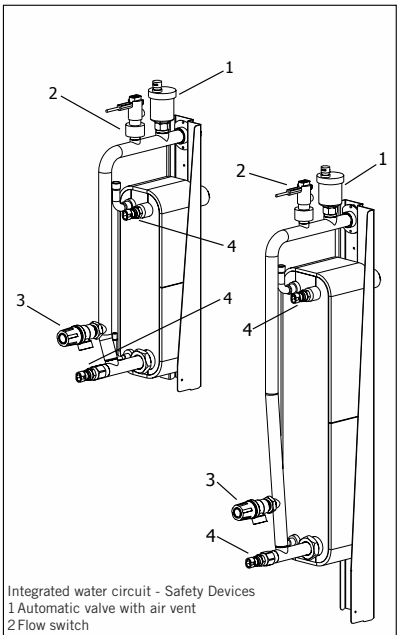
1. Automatic valve with air vent
2. Flow switch
3. Pressure relief valve (300kPa, outlet 1/2')
4. Temperature probe

Fig. 11

A - Water flow rate, (l/s)
B - Pressure drop (kPa)

Pipe water content			
Internal Diameter		Outer diameter	Liters / meter
copper	12 mm	14 mm	0,11 l/m
	14mm	16 mm	0,15 l/m
	16mm	18 mm	0,20 l/m
	20mm	22 mm	0,31 l/m
	25mm	28 mm	0,49 l/m
	32mm	35 mm	0,80 l/m
steel	12.7 mm (1/2)" "	3/8'Gas	0,13 l/m
	16.3 mm (5/8)" "	1/2'Gas	0,21 l/m
	21.7 mm (7/8)" "	3/4'Gas	0,37 l/m
	27.4 mm (11/16)" "	1"Gas	0,59 l/m

Unit			Aeromax Plus				
			4kw	6kw	8kw	12kw	15kw
Nominal water flow	Std	l/s	0.2	0.28	0.33	0.58	0.69
Working pressure	Max	kPa	300	300	300	300	300
Filling pressure	Min	kPa	120	120	120	120	120
Difference in level with unit at lowest level	Max	m	20	20	20	20	20



Integrated water circuit - Safety Devices
1 Automatic valve with air vent
2 Flow switch
3 Pressure relief valve (300kPa, outlet 1/2')
4 Temperature probe

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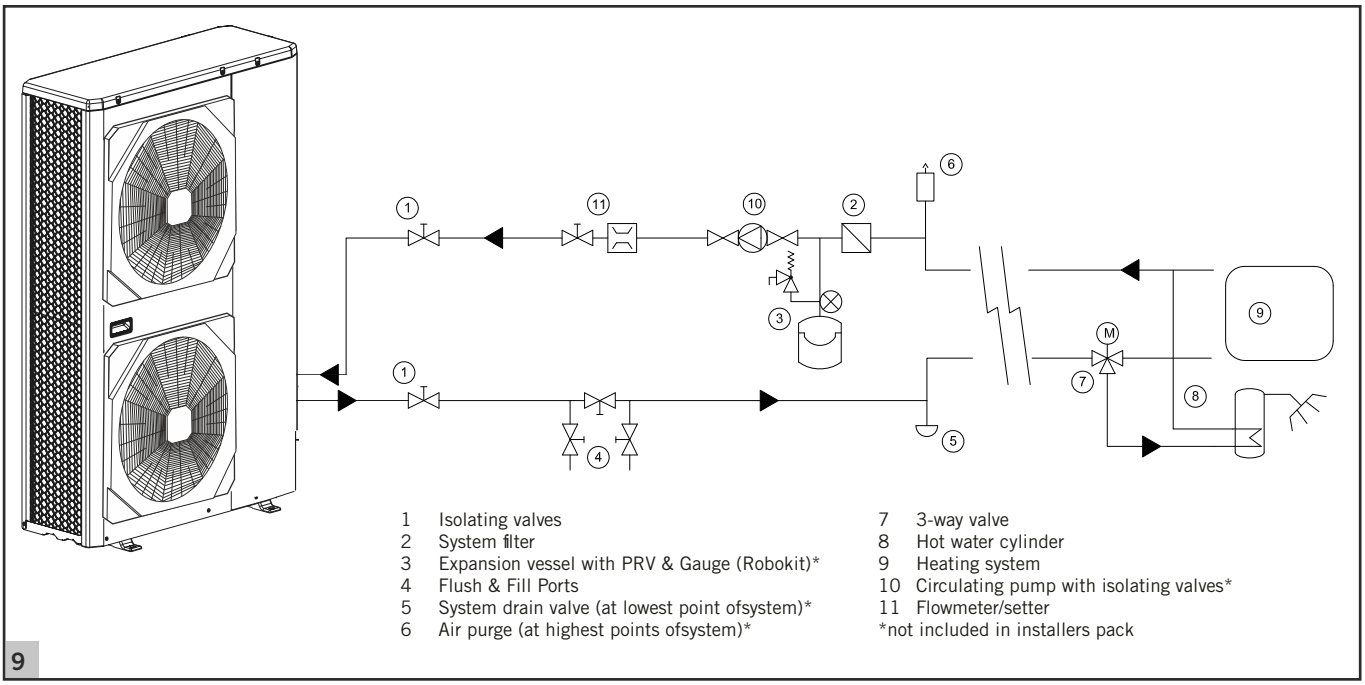

1 Isolating valves
2 System filter
3 Expansion vessel with PRV & Gauge (Robokit)*
4 Flush & Fill Ports
5 System drain valve (at lowest point ofsystem)*
6 Air purge (at highest points ofsystem)*
7 3-way valve
8 Hot water cylinder
9 Heating system
10 Circulating pump with isolating valves*
11 Flowmeter/setter
*not included in installers pack

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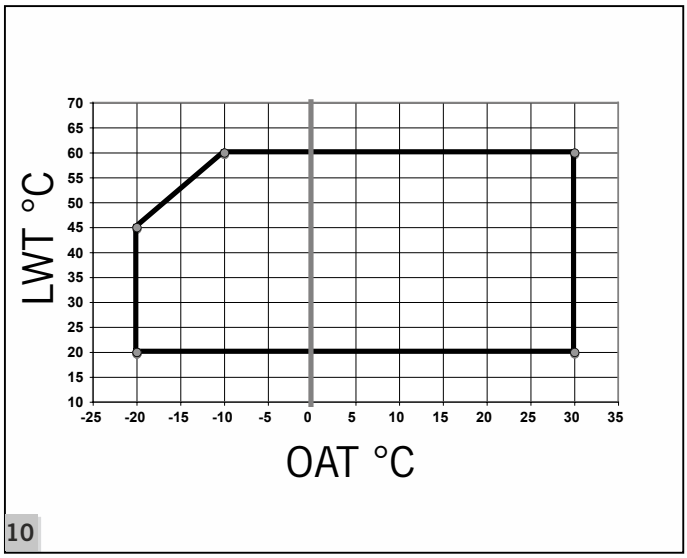

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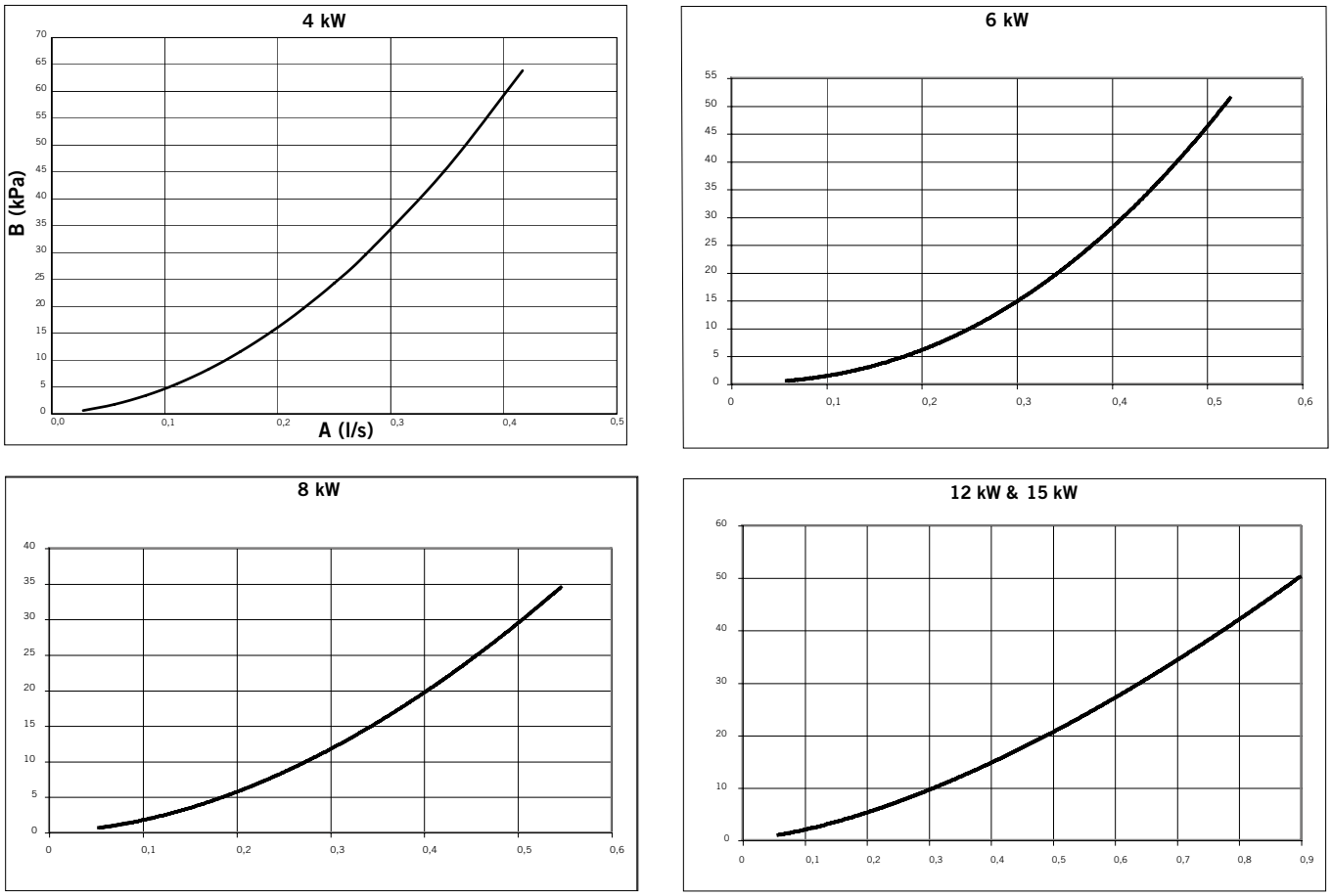

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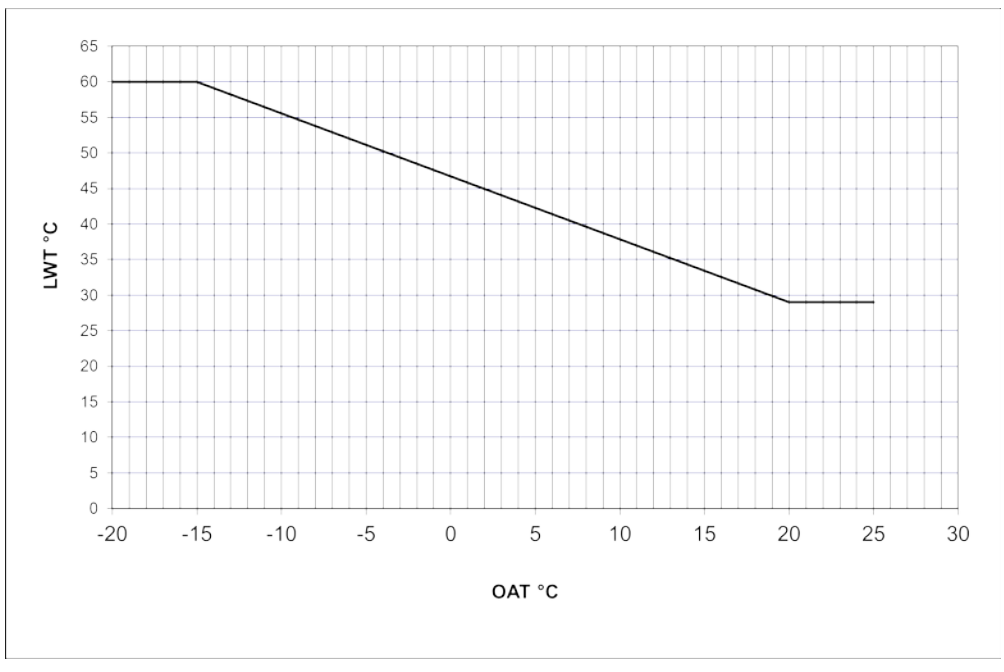


12

	% Inhibited Propylene Glycol	10%	20%	30%	40%
	Freezing time (*)	-4 °C	-9 °C	-15 °C	-23°C
Correction Factors	Capacity	0,996	0,991	0,983	0,974
	Absorbed power	0,990	0,978	0,964	1,008
	Loss of head	1,003	1,010	1,020	1,033
(*) Note: Temperature values are indicative. Always refer to the temperatures indicated for the specific product used					

TABLE TO USE FOR CALCULATING THE WATER CONTENT IN THE SYSTEM		
Installed Unit		.....
Unit content (*)	l	.....
Pipe content (**)	l	.....
Uses (fan-coil, panels, radiators, etc.) (***)	l	.....
Total content (****)	l	.....

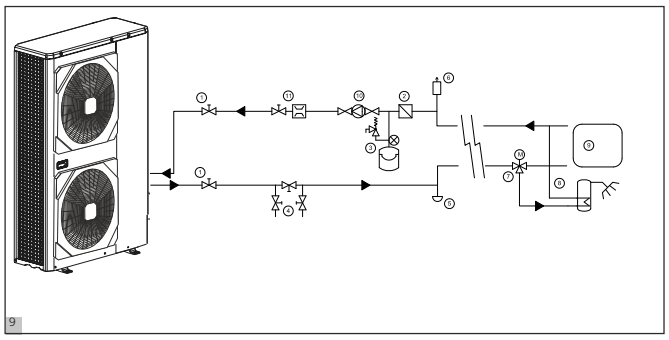
(*) Consult the technical data table.
(**) Consult the pipe water content table.
(***) Consult the manual from the relevant manufacturer.
(****) The water content of the system must be greater than the minimum value for units without hydronic kit. The minimum value is necessary to provide optimal comfort.

Detailed installation schematics can be found at the back of the manual.
Should you require further technical assistance call your local office – details on the back page of this manual.

Recommended water diagram (Fig. 9)

Typical water circuit diagram for Aeromax Plus unit (see fig. 9)

1 Isolating valves
2 System filter
3 Expansion vessel with PRV & Gauge (Robokit)*
4 Flush & Fill Ports
5 System drain valve (at lowest point of system)*
6 Air purge (at highest points of system)*
7 3-way valve
8 Hot water cylinder
9 Heating system
10 Circulating pump with isolating valves*
11 Flowmeter/setter
*not included in installers pack



Do not use the heat pump to treat industrial process, swimming pool or sanitary water. In all these cases, provide an intermediate heat exchanger.

Aeromax Plus Expansion Vessel Sizing – Sizing Examples

			Maximum Working Temperature						
			30	40	50	60	70	80	90
			Coefficient of Fluid Expansion with respect to 10°C (30% Glycol/ Water)						
			0.00272	0.00499	0.00779	0.01108	0.0148	0.01891	0.02336
Pre-charge Pressure (Air side of vessel)	Max System Pressure (Pressure Relief Valve Rating)	System Volume (Litres)	Approximate Expansion Vessel Volume Required (Litres) as a Function of the Max Working Temperature						
0.5	1	100	1.1	2	3.1	4.4	5.9	7.6	9.3
0.5	1.5	100	0.7	1.2	1.9	2.8	3.7	4.7	5.8
0.5	2	100	0.5	1	1.6	2.2	3	3.8	4.7
0.5	2.5	100	0.5	0.9	1.4	1.9	2.6	3.3	4.1
1	1.5	300	4.1	7.5	11.7	16.6	22.2	28.4	35
1	2	300	2.5	4.5	7	10	13.3	17	21
1	2.5	300	1.9	3.5	5.5	7.8	10.4	13.2	16.4
1	3	300	1.6	3	4.7	6.6	8.9	11.3	14
1.5	2	500	8.2	15	23.4	33.2	44.4	56.7	70.1
1.5	2.5	500	4.8	8.7	13.6	19.4	25.9	33.1	40.9
1.5	3	500	3.6	6.6	10.4	14.8	19.7	25.2	31.2
2	2.5	1000	19.1	34.9	54.5	77.5	103.6	132.4	163.5
2	3	1000	10.9	19.9	31.2	44.3	59.2	75.7	93.5

If the system details are outside of the range shown in the table the expansion vessel size can be calculated using the following formula:

$V = e * C / \{1-[(P_{pre} + 1)/(P_{max} + 1)] \}$

Where:
e = Coefficient of Fluid Expansion with respect to 10°C (30% Glycol/Water)
C = total System Volume (litres).
P_{pre} = Pre-charge Pressure (Bar)
P_{max} = Max System Pressure (Bar)

Note: the required vessel volume will almost certainly not correspond exactly to an existing size, therefore the nearest available size above the value returned for V must be selected from the available vessels in the range.

The calculation is valid provided the expansion vessel and the safety valve are at the same height. The maximum system pressure for Aeromax Plus Heat Pumps is 3 bar.

Cylinder Installation for Domestic Hot Water

We recommend the Kingspan Albion Aerocyl is used as it has a heat pump specific coil fitted.

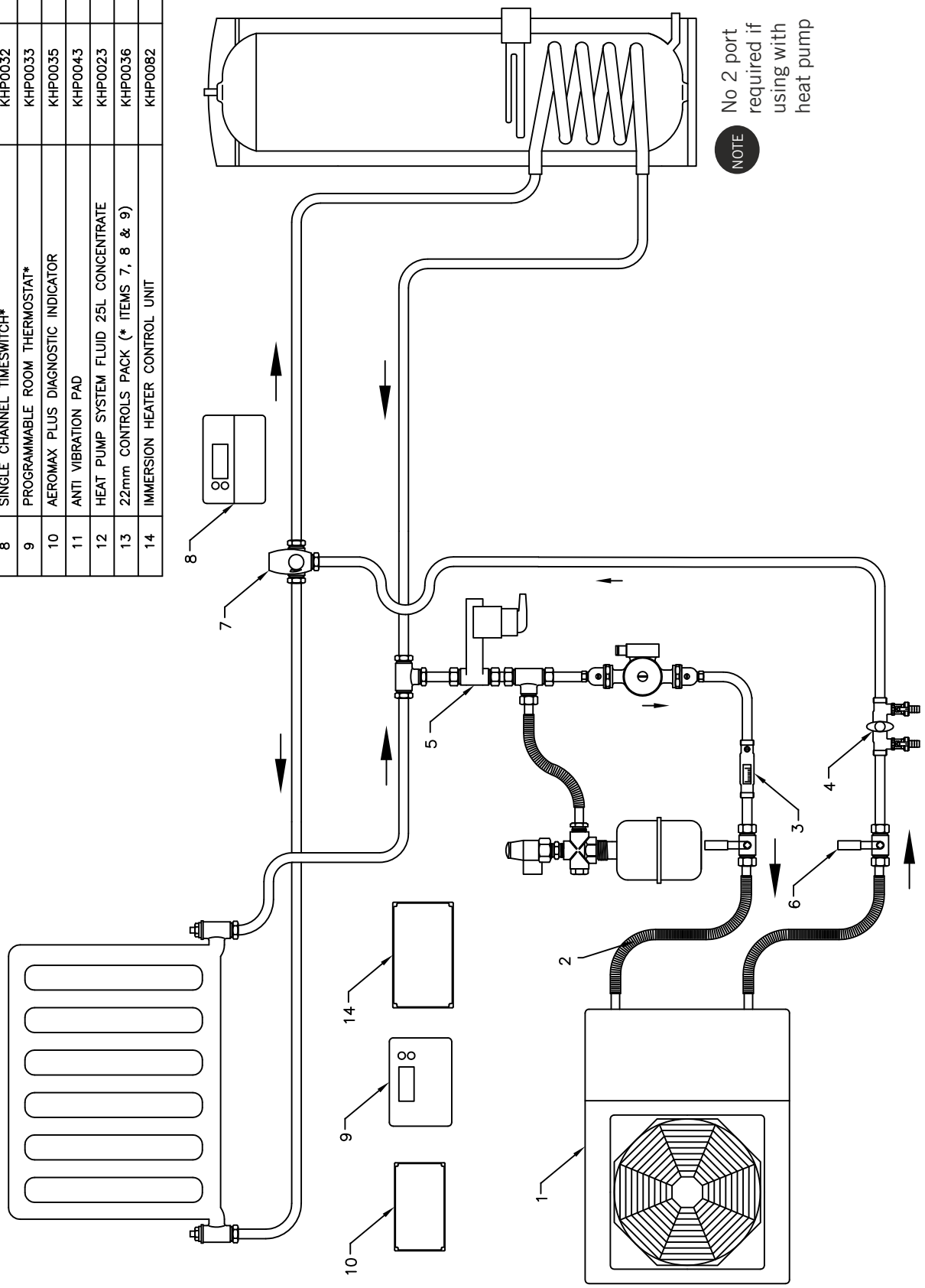
! Note...

If the Aerocyl is used in conjunction with the 3 port valve supplied with the Aeromax plus there is no requirement for the additional 2 port valve.

Water connections (Typical Schematic for Radiator System)

4, 6 & 8 kW

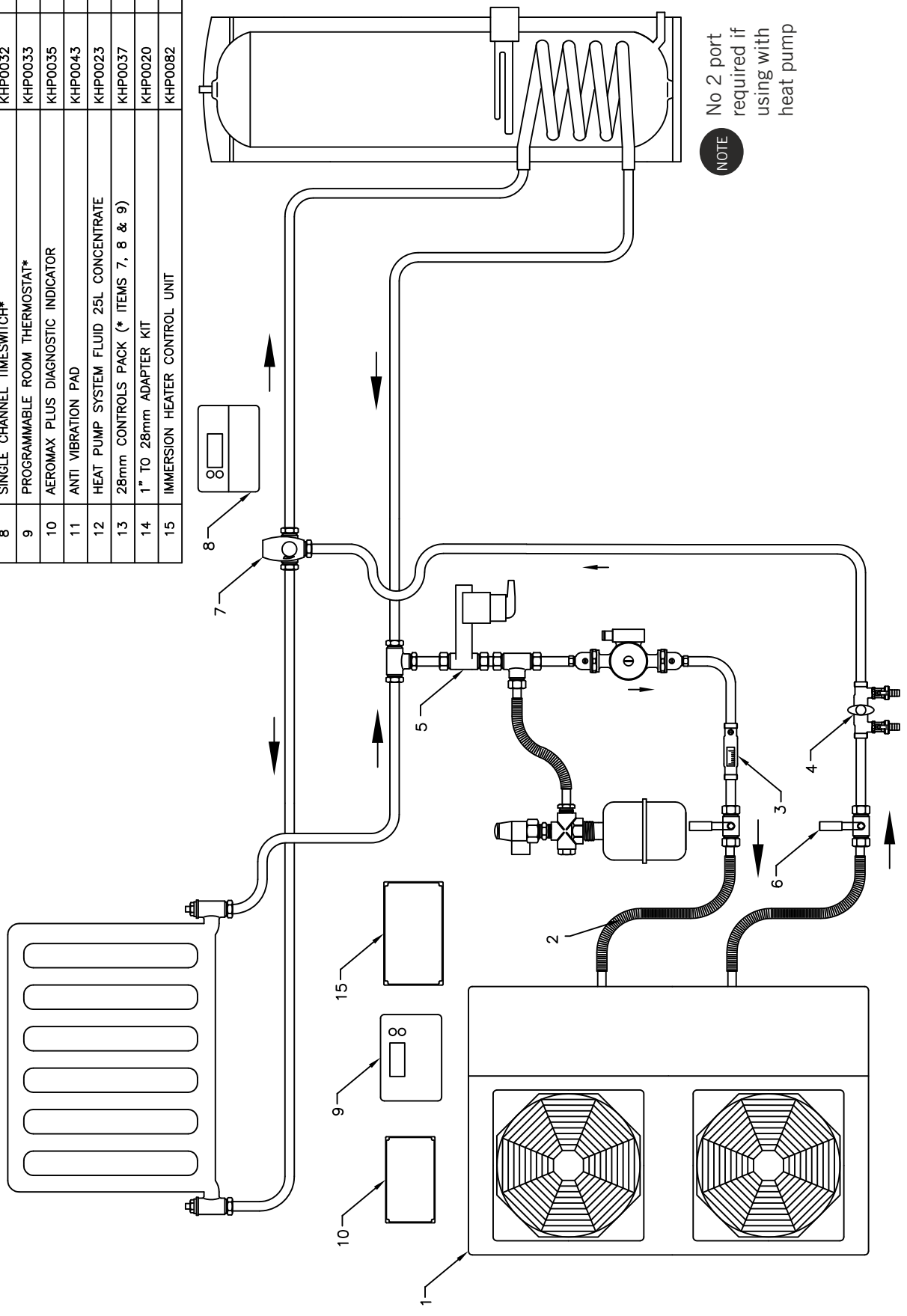
ITEM	DESCRIPTION	PART No.	QTY
1	AEROMAX PLUS 4\6\8kW HEATPUMP	KHP0041\38\39	1
2	1" to 22mm FLEXIBLE CONNECTION HOSES 750mm	KHP0018	1
3	22mm FLOW REGULATOR/FLOWMETER	KSP0214	1
4	FLUSH & FILL PORT 22mm	KHP0027	1
5	FILTER 22mm	KSP0180	1
6	22mm COMP FULL BORE LEVER VALVE	KSP0220	1
7	22mm 3 PORT DIVERTER VALVE & ACTUATOR*	KSP0222/223	
8	SINGLE CHANNEL TIMESWITCH*	KHP0032	
9	PROGRAMMABLE ROOM THERMOSTAT*	KHP0033	
10	AEROMAX PLUS DIAGNOSTIC INDICATOR	KHP0035	1
11	ANTI VIBRATION PAD	KHP0043	4
12	HEAT PUMP SYSTEM FLUID 25L CONCENTRATE	KHP0023	1
13	22mm CONTROLS PACK (* ITEMS 7, 8 & 9)	KHP0036	1
14	IMMERSION HEATER CONTROL UNIT	KHP0082	1



Water connections (Typical Schematic for Radiator System)

12 kW

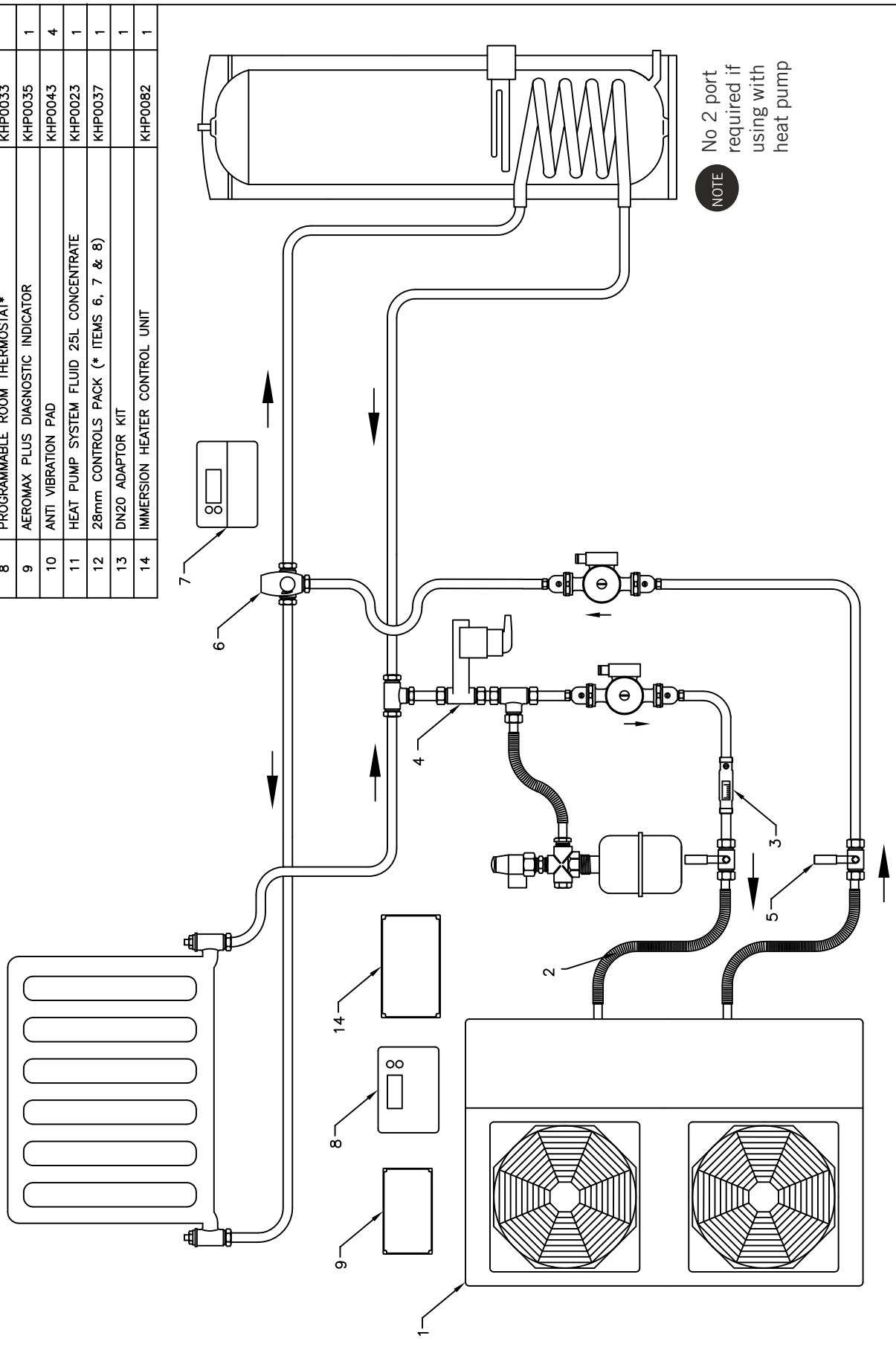
ITEM	DESCRIPTION	PART No.	QTY
1	AEROMAX PLUS 12kW HEATPUMP	KHP0040	1
2	1" to 28mm FLEXIBLE CONNECTION HOSES 750mm	KHP0019	1
3	1" MALE FLOW REGULATOR/FLOWMETER	KSP0215	1
4	FLUSH & FILL PORT 1"	KHP0028	1
5	FILTER 28mm	KSP0181	1
6	28mm COMP FULL BORE LEVER VALVE	KSP0221	1
7	28mm 3 PORT DIVERTER VALVE & ACTUATOR*	KHP0222/224	
8	SINGLE CHANNEL TIMESWITCH*	KHP0032	
9	PROGRAMMABLE ROOM THERMOSTAT*	KHP0033	
10	AEROMAX PLUS DIAGNOSTIC INDICATOR	KHP0035	1
11	ANTI VIBRATION PAD	KHP0043	4
12	HEAT PUMP SYSTEM FLUID 25L CONCENTRATE	KHP0023	1
13	28mm CONTROLS PACK (* ITEMS 7, 8 & 9)	KHP0037	1
14	1" TO 28mm ADAPTER KIT	KHP0020	1
15	IMMERSION HEATER CONTROL UNIT	KHP0082	1



Water connections (Typical Schematic for Radiator System)

15 kW

ITEM	DESCRIPTION	PART No.	QTY
1	AEROMAX PLUS 15kW HEATPUMP	KHP0042	1
2	1" to 28mm FLEXIBLE CONNECTION HOSES 750mm	KHP0019	1
3	DN20 MALE FLOW REGULATOR/FLOWMETER	KSP0216	1
4	DN20 DIRT SEPARATOR (HORIZONTAL MOUNT)	KSP0270	1
5	28mm COMP FULL BORE LEVER VALVE	KSP0221	1
6	28mm 3 PORT DIVERTER VALVE & ACTUATOR*	KHP0222/224	
7	SINGLE CHANNEL TIMESWITCH*	KHP0032	
8	PROGRAMMABLE ROOM THERMOSTAT*	KHP0033	
9	AEROMAX PLUS DIAGNOSTIC INDICATOR	KHP0035	1
10	ANTI VIBRATION PAD	KHP0043	4
11	HEAT PUMP SYSTEM FLUID 25L CONCENTRATE	KHP0023	1
12	28mm CONTROLS PACK (* ITEMS 6, 7 & 8)	KHP0037	1
13	DN20 ADAPTOR KIT		1
14	IMMERSION HEATER CONTROL UNIT	KHP0082	1



Electrical connections (Fig. 13)

All field electrical connections are the responsibility of the installer.

WARNING

Make water connections before electrical connections. Make ground connection prior to any other electrical connections.

Unit		Aeromax Plus				
		KHP041	KHP0038	KHP0039	KHP0040	KHP0042
		4kW	6kW	8kW	12kW	15kW
Power Supply	V - ph - Hz	230 - 1 - 50				
Allowable Voltage Range	V	207/253				
Maximum Power Drawn	kW	2	2.3	2.7	5.1	5.1
Maximum Current Drawn	A	7.2	11	14	23	20
Power Fuses	Type	gL Type				
	Current (A)	10 Type B	15 Type B	15 Type B	25 Type D	25 Type D
Power Supply Cables	mm2	H07RN-F 3 x 2.5mm^2				
Maximum Circulating Pump Current	A	2				
Use cables H03VV-F 4x0.75 mm^2 to connect the control to wire User Comfort Interface (KHP0008)						

Remove the front panel, the electric parts appear at the front side. The power supply cables can be inserted into the holders. Be sure to fix the power cable with bundling band sold on the market so that they do not make contact with the compressor and the hot pipes.

To ensure good tensile strength, the electric cables must be fastened using the cable-holder on the plate.
The unit can be controlled and set via:

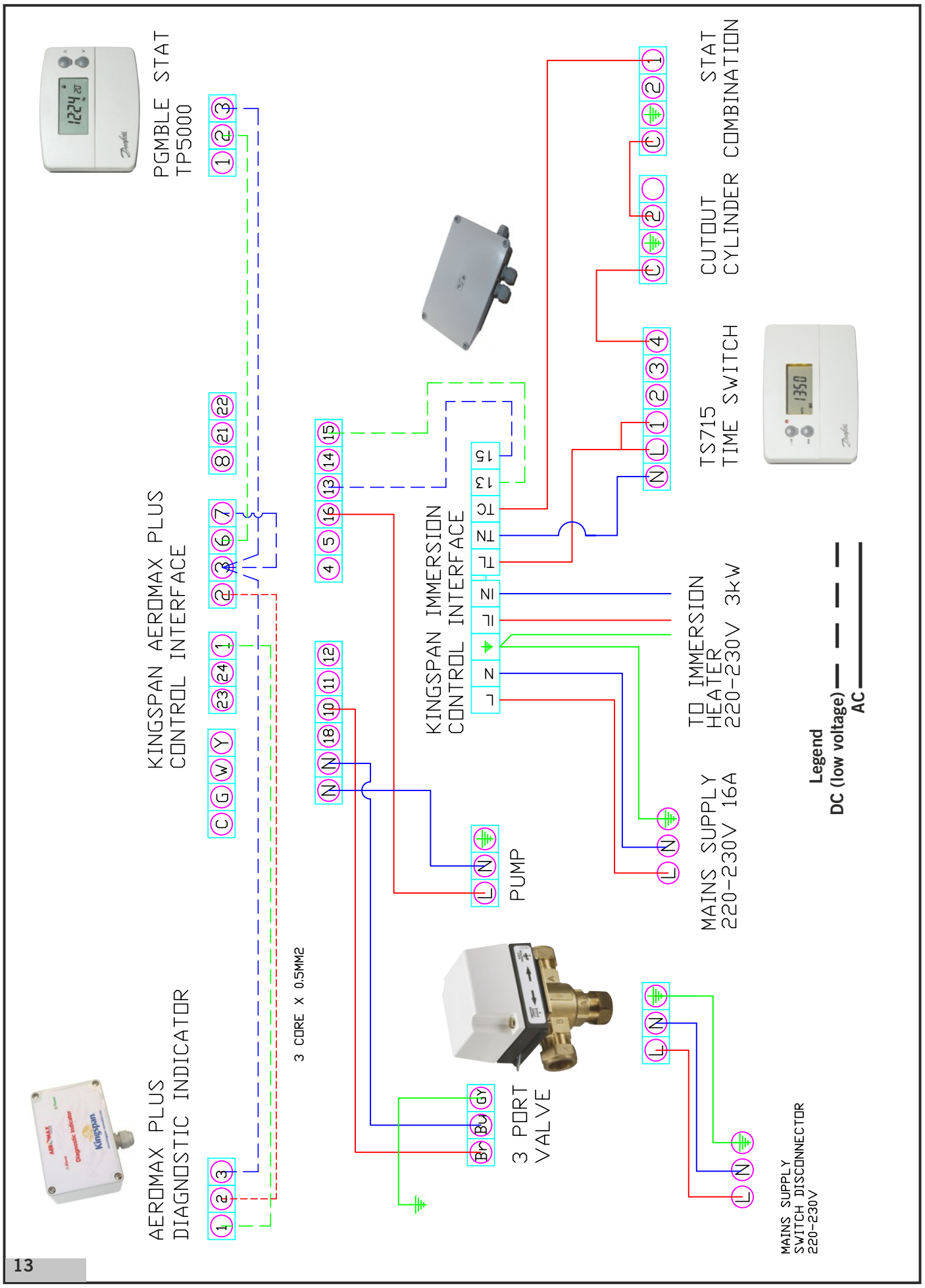
- User Comfort Interface wire control KHP0008 (Optional)
- Aeromax Plus Controls Pack KHP0036/37
- Switches (not supplied)

For the electrical connections refer to wiring diagram, while, for use, refer to the relative manuals.

Only for KHP0042 use the strain reliefsupplied with the unit.

Cables from Indoors – Heat Pump
2 x 3 core 240v
1 x 7 core for 0-12v
1 x 3 core mains to HP

Wired control	For installation of wired remote controller please refer to the control installation manual.
Power supply	Size the cable, the cables must be H07RN-F type (3 x 2.5 mm^2). According to the installation instructions, all devices for disconnection from the power supply mains must have a contact opening (4 mm) to allow total disconnection according to the conditions provided for the overvoltage class III. To prevent any risk, the power cable must only be replaced by the technicians ofthe after-sales service.


PGMBLE STAT
TP5000
KINGSPAN AEROMAX PLUS
CONTROL INTERFACE
AEROMAX PLUS
DIAGNOSTIC INDICATOR
3 CORE X 0.5MM2
KINGSPAN IMMERSION
CONTROL INTERFACE
PUMP
3 PORT
VALVE
CUTOUT STAT
CYLINDER COMBINATION
TS715
TIME SWITCH
TO IMMERSION
HEATER
220-230V 3kW
MAINS SUPPLY
220-230V 16A
MAINS SUPPLY
SWITCH DISCONNECTOR
220-230V
Legend
DC (low voltage)
AC

Auxiliary accessories connection (Fig. 13)

3-way valve

The Aeromax Plus units drive a 3-way valve to manage a Domestic Hot Water cylinder. The operating logic provides that, in the case of a request for sanitary water by a DHW cylinder, the system controls a 3-way valve to direct the hot water only to the tank and to operate at the maximum capacity to provide water at 60 ℃ (compatible with the operating envelope).

The hot water request signal must be a Dry Contact type (contact quality greater than 25mA @ 12V) that closes the circuit between PINS 15 and 13 of the terminal strip (see Fig. 13 page 21).

Attention: The hot water request has higher priority than the programmed operating mode in heating.

Frequency Limitation

To force the unit to operate at a lower maximum frequency (to reduce noise) in the absence of a User Comfort Interface, provide a Dry Contact (contact quality greater than 25mA @ 12V) between PINS 13 and 14 of the terminal strip. With the contact closed, the unit will operate with a maximum frequency lower than the standard one, otherwise it will operate in standard mode.

For correct operation, it is necessary to configure the unit using parameters 5 and 6 from the User Interface menu of the KHP0008. The maximum noise reduction is about 3dB at 75% of the maximum operating frequency of the compressor

Stop Unit or Defrosting signals

There are several signals available on the terminal strip to indicate particular conditions or the stop of the external unit. The available signals are:

- Defrosting: When operating in Heating mode, depending on the external environmental conditions, the unit could perform defrosting cycles to clean the external battery of any ice formations. Under these conditions, it is not possible to guarantee the requested temperature output water temperature, which could reduce general comfort.
- Alarm: Indicates an alarm condition that stops the compressor.
- Ambient Temperature Reached: If suitably programmed using the User Comfort Interface, and operating with this interface, a signal is provided that indicates that the pre-set temperature has been reached. This signal can be used as the contact window normally implemented in the fan-coils.

Several outputs are used for more than one condition. It is possible to configure these outputs through the User Comfort Interface installation menu (refer to the KHP0008 manual part number A9315). Refer to the tables for the correct pin-outs and use of the signals.

External temperature probe

If the positioning of the external unit could induce a non-representative reading of the external temperature by the probe positioned on the machine, an additional remote temperature probe can be provided (NTC 2 wire, 3kΩ @ 25℃, Kingspan Part Number KHP0009). Connect the terminals of the probe between PINS 23 and 24 of the terminal strip (see Fig. 13).

Legionella Protection

Sanitization of the DHW cylinder is controlled by setting the time on the 7 day programmer installed. To sanitise the water in the cylinder set the hot water period to more than 50 mins.

Example:

Heat pump programmed to heat water 4:00 am – 5:30 am. Heat pump will produce hot water for 50 mins to approx 55°C. Immersion heater will activate for the remaining 40mins to raise water temperature to 60℃+.

The immersion heater will stop when the immersion heater thermostat activates.

Auxiliary accessories connection

Signal for requesting an External Heat Source or Dehumidification

Between PINS 4 and N of the terminal strip (see Fig. 13),there is an output (1ph ~ 230V, 2A max) that can be programmed using the remote User Comfort Interface (see the control manual, Installation Menu code 106). when OAT < Temperature set in KHP0008 code 150 (but OAT > temperature set in KHP0008 code 148). In this region HP keeps working and backup heater turns on if set point on water is not reached by 5℃ (value can be set with KHP0008 CODE 152) for 10 minutes (value can be set with KHP0008 CODE 151). Backup heater turns off when set point on water is reached again.

IMPORTANT NOTICE :

In case of SHW activation (pins 13-15 closed) heat pump will turn on and backup heater will turn off. This will happen in both the above strategies.

WARNING :

In case of EHS installation, it is mandatory to install a thermal switch on the water circuit to protect the system from too high water temperatures. This protection item has to be located downstream from the EHS.

Additional water circulator for Aeromax Plus

It is possible to connect an additional water pump through the pins 12 and N. It is managed in the following way:

If OAT > temperature set in KHP0008 code 148

The additional water pump activation depending on the setting of KHP0008 code 156

1. ON/ OFF depending on the outdoor unit water pump logic, in case of SHW activation ADD WP is ON;
2. ON/ OFF depending on the outdoor unit water pump logic, in case of SHW activation ADD WP is OFF;

If OAT < temperature set in KHP0008 code 148

The additional water pump activation depends on the setting of KHP0008 code 157 (0. always ON, 1. always OFF or 2. ON/OFF depending on EHS).

External Alarm Input

On PIN 21 of the terminal strip (see Fig. 13) an alarm input (dry contact) is available to force off the unit. When the contact is closed (Pin 21 active) the whole system is turned OFF (Unit OFF, WP OFF, GMC alarm n° 2). When the dry contact open the system turns ON and works in the last configuration.

It is possible to use this feature connected with different external control systems and/or safety devices. For example in case of danger an external safety device could send an output alarm signal to close the contact. So the outdoor unit turns off and remains in that condition until the dry contact is reopened.

Terminal Strip Pin Layout

Aeromax Plus				
Description	PIN	Signal	Limits	KHP0008 Installation Menu
Additional external temperature	23 - 24	Input (NTC 3kΩ @25℃)	N.A.	126
Sanitary Water Request switch	13 - 15	Input (contact	N.A.	N.A.
Maximum Frequency Reduction	13 - 14 switch	Input (contact	N.A.	N.A.
3-way valve	10 - 18 - N	Output 230Vac (18-N: Power supply, 10	1 ph ~ 230V, 2A	N.A.
1- External Heat Source Request	4 - N	Relay Output Contact	1 ph ~ 230V, 2A	106 - 148 -150 -151 - 152 -154 -155
2- Defrost				
1- Alarm	5 - N	Relay Output Contact	1 ph ~ 230V, 2A	147
2- Ambient temperature reached				
1- Alarm + defrost	11 - N	Relay Output Contact	1 ph ~ 230V, 2A	107 - 108
2-Humidifier				
1- Trace heater	12 - N	Relay Output Contact	1 ph ~ 230V, 2A	156 - 157
2-Additional WP				
Alarm input	21	Input (contact switch quality >25mA@12V)	N.A.	N.A.
External Water Circulator	16 - N	Relay Output Contact	1 ph ~ 230V, 2A	N.A.
NORMAL / ECO Mode	8 - 3	Dry contact	N.A.	N.A.

Note: The maximum total instantaneous current must be less than 3.5A. In the case of loads with higher absorbed current, it is necessary to drive the loads with relays to be inserted between the power supply of the load itself and drive the relays from the terminal strip.

Inverter board alarm codes KHP0040 12kW unit only (Fig. 14)

Faults of the inverter can be diagnosed by LED indications on the cycle control P.C. board of the outdoor unit. Utilize them for various checks.

Before a check, confirm each bit of the DIP switch is set to OFF position.

LED indication and code checking

LED indication	Cycle control P.C. board				Cause
	LED indication				
	D800	D801	D802	D803	
D800 O: Red D801 O: Yellow D802 O: Yellow D803 O: Yellow ●: Flashing ♦: Off O: On	O	●	●	●	Heat exchanger sensor (TE) error
	●	●	O	●	Suction sensor (TS) error
	O	O	●	●	Hot gas discharge sensor (TD) error
	●	O	●	O	High-pressure protection error
	●	O	●	●	Outdoor air temperature sensor error (TO)
	O	O	O	●	Outdoor motorised fan error DC
	O	●	●	O	Communication error between IPDU (Abnormal stop)
	●	O	●	O	High-pressure release operation
	●	O	O	●	Discharge temp. error: hot gas is too high
	O	O	●	O	EEPROM error
	●	●	O	O	Communication error between IPDU (No abnormal stop)
	♦	●	●	●	G-Tr short-circuit protection
	●	♦	●	●	Detect circuit error
	●	♦	●	●	Current sensor error
	●	●	♦	●	Comp. lock error
	♦	●	♦	●	Comp. break down

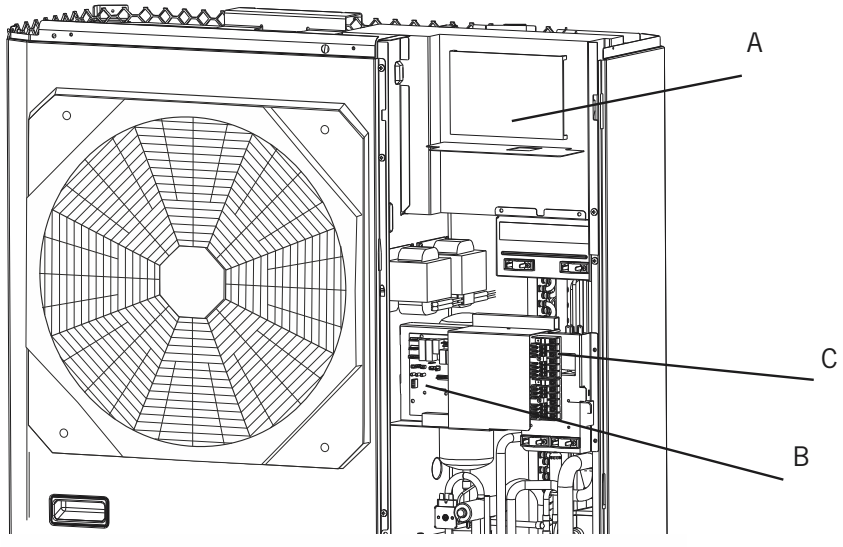
Board position Fig. 14

Legend:

A Position 4 LED Inverter Diagnostics Board (KHP0040/42 only)

B Position LED GMC Diagnostics Board

C Installation terminal strip

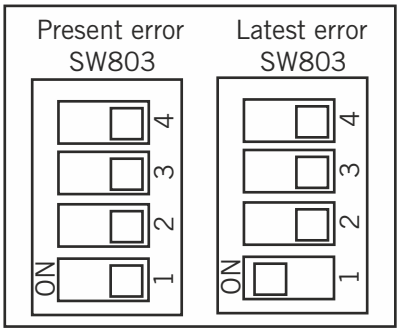


14

Inverter board alarm codes (only for KHP0042 15kW unit) (Fig. 14)

The error which is generating at present and the latest error (Latest error information including present) can be confirmed by lighting LED D800 to D804 on the outdoor control P.C board.

a) When all DIP switch SW803 are OFF, the status of error which is generating at present is displayed.
b) <1> only of DIP switch SW803 is turned on, the error which generated before (latest error information including present) is displayed.
c) If there is an error, any of LED D800 to D804 goes on. (Display 1)
d) When pushing the pushdown button switch SW800 for approx. 1 second, the display is exchanged. (Display 2)
e) When pushing SW800 again or after 2 minutes, the status returns to that of Display 1.



Legend

● D800 (Yellow)
● D801 (Yellow)
◎ D802 (Yellow)
● D803 (Yellow)
● D804 (Yellow)
O D805 (Green)

●: Go off, O: Go on, ◎: Flash

Display 1 (Initial Display)	Display 2 (SW800 operation)	Error contents
●●●●●O	●●●●●O	Normal
○○●●○○	●●◎●●O	Discharge temp. sensor (TD) error
	●◎◎●●O	Heat exchanger temp. sensor (TE) error
	◎◎◎●●O	Heat exchanger temp. sensor (TL) error
	●●●◎●O	Outside temp. sensor (TO) error
	●●◎◎●O	Suction temp. sensor (TS) error
	◎●◎◎●O	Heat sink temp. sensor (TH) error
	◎◎◎◎●O	Heat exchanger sensor (TE, TS) error
	◎◎◎◎◎O	EEPROM error
●●○●○○	◎●●●●O	Compressor break down
	●◎●●●O	Compressor lock
	◎◎●●●O	Current detection circuit error
	●●◎●●O	Case thermostat operation
●○○●○○	●◎●◎●O	Model unset
	◎●◎◎◎O	Communication error between MCU
	◎◎◎◎◎O	Other error (compressor disorder ect.)
○○○●○○	◎◎●●●O	Discharge temp. error
	◎●◎●●O	Power supply error
	◎◎◎●●O	Heat sink overheat error
	◎◎◎◎●O	Gas leak detection
	◎◎●●◎O	4-way valve reverse error
	●●◎●◎O	High pressure protective operation
	●◎◎●◎O	Fan system error
	●◎●◎◎O	Driving element short-circuit
	◎●◎◎◎O	Position detection circuit error

GMC Board Alarm Codes (Fig. 14)

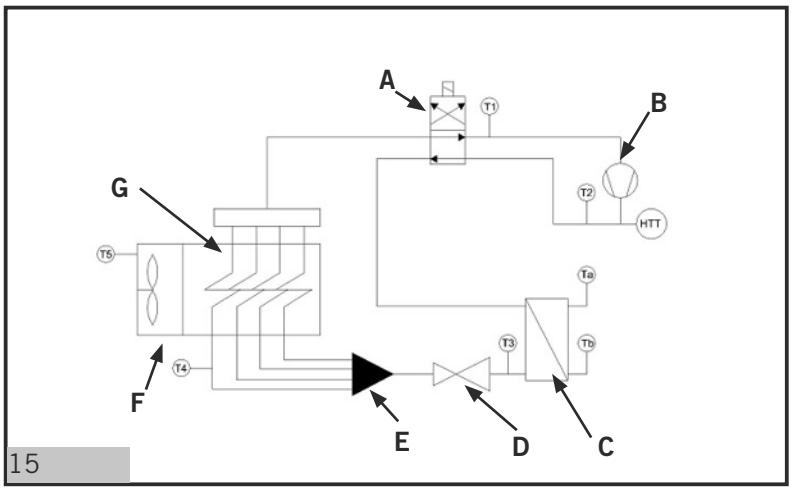
There is an LED on the GMC board that displays any board errors. The error code can be identified from the flashing LED using the following table. In the case of more than one error, the error with the highest priority will be displayed until it is resolved.

In the case of normal operation, the LED flashes at a frequency of 0.5 Hz. In the case of an error, the LED remains off for 4 seconds, then at a frequency of 1 Hz, it flashes a number of times equal to the error code and than remains off again for 6 seconds. If the error code has 2 digits, the flashing is interrupted for 2 seconds between the first and second digits.

Example: error 23: LED off for 4 seconds. 2 flashes at a frequency of 1 Hz. Off for 2 seconds. 3 flashes at a frequency of 1 Hz. Off for 6 seconds. The cycle repeats until the LED turns off because the problem is resolved or if an error with higher priority occurs.

To reset the unit after an error has been cleared turn off the mains supply for 10 seconds and turn on again.

Fault Code	Code Description
2	Safety Input
3	Enter Water Temperature Sensor (EWT) Failure/Out of Range
4	Actual Refrigerant Temperature Sensor BPHE (TR) Failure/Out of Range
5	Outdoor Air Sensor of GMC
6	Loss communication to NUI control
7	NUI control Room Sensor
8	Unit Capacity Mismatch
9	Flow Switch error / Water Pump
10	EEProm Corrupt
13	Loss Communication to RS485 (system configuration type 6)
14	Loss of Signal From inverter board/High Temperature Release (Thermostat on compressor: 120°±4°C)
15	Exit water Temperature Sensor (LWT) Failure/Out of Range
17	Inverter Air Sensor (TO) Failure/Out of Range
18	G-Tr inverter short circuit protection
20	Compressor position Detection Circuit error
21	Inverter Current Sensor error
22	Heat Exchanger Sensors (TE) / (TS) Failure/Out of Range
23	Discharge Temperature Sensor (TD) (TD > 100° ± 4° C)
24	Outdoor Fan motor error
26	Other inverter board error
27	Compressor Lock
28	Discharge Temperature error Failure/Out of Range
29	Compressor Breakdown



15

A: 4 way valve
B: DC Rotary Compressor
C: BPHE
D: Pulse Motor Valve
E: Distributor
F: Fan
G: Heat Exchanger
HTT: High Temperature Thermostat
T1: TS sensor
T2: TD sensor
T3: TR sensor
T4: TE sensor
T5: TO sensor
Ta: EWT sensor
Tb: LWT sensor

Type of Safety Device	Operating Condition	Release/Reset
Pressure Relief Valve (Water side - see Fig 8)	300 kPa	Self Reset
Flow Switch (Water side - see Fig 8)	> 8 l/min	< 6 l/min
High Temperature Thermostat (see Fig 15)	> 120 °C	< 90 °C
Refrigerant Temperature Sensors (Fig 15 T1 to T5)	"Failure/Out of Range (Operating range depends on sensor location)"	In Range
Water Temperature Sensors (Fig 15 Ta & Tb)	T < 0 °C, T > 70 °C	0 °C ≥ T ≤ 70 °C
Anti-Freeze Protection (Fig 15 T5)	Adjustable from 2 to 6 °C	Software controlled
Compressor Start Acceleration limit	6 accelerations/hr	N/A
Delayed Compressor Start (OFF - ON)	180 secs (max)	N/A
Delayed Compressor Stop (ON - OFF)	180 secs	N/A

IMPORTANT

During functioning in heat pump heating mode, the unit performs defrost cycles to eliminate any ice that might form at low temperatures inside the outdoor unit

Refrigerant charge check

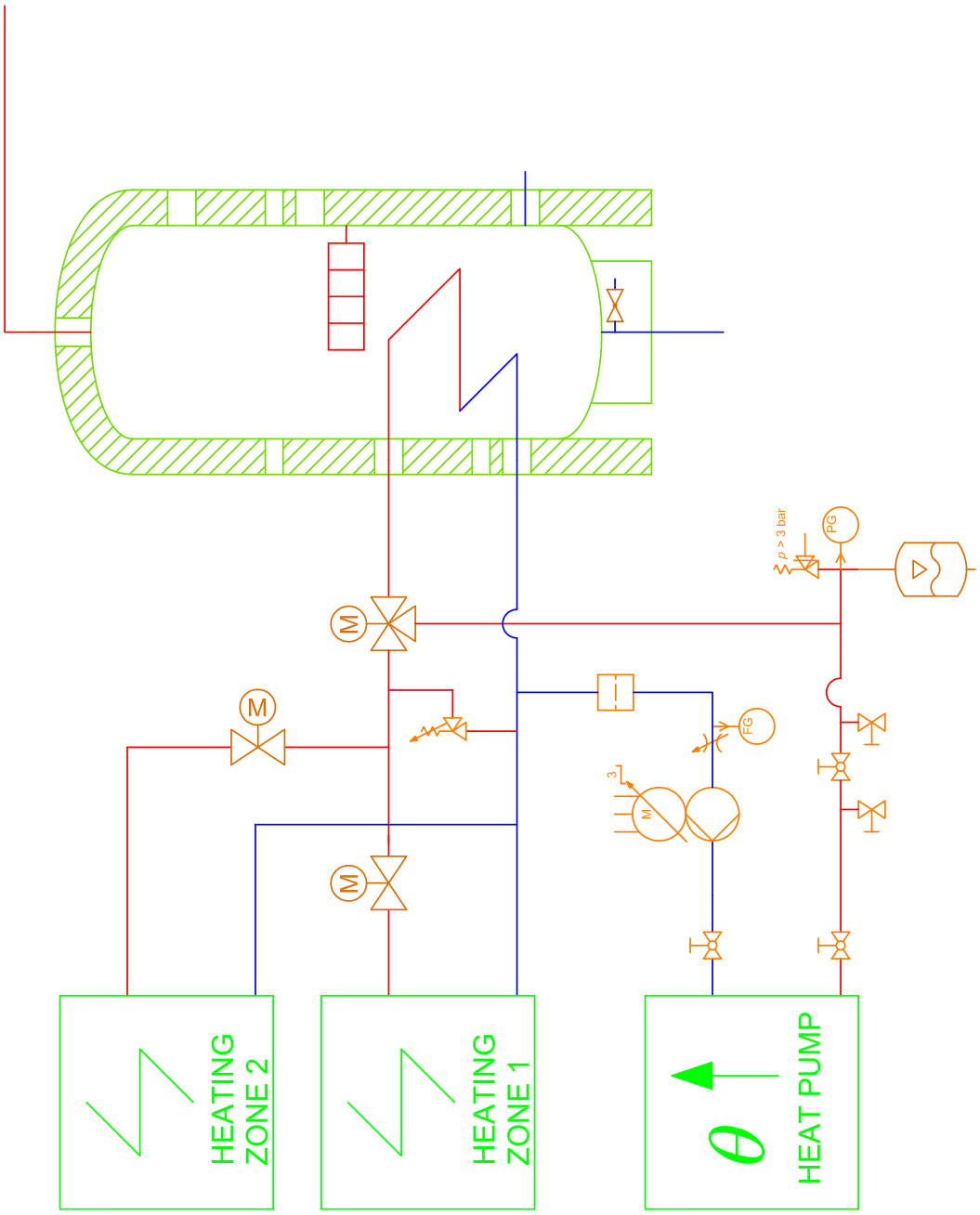
This check becomes necessary after any refrigerant leak or after replacement of the compressor. The best method to correctly charge refrigerant is to completely empty the refrigerant circuit using refrigerant recovery equipment. Then charge the exact quantity ofrefrigerant according to the data shown on the unit nameplate and always considering the additional charges listed on the charge sheet.

R-410A systems must be charged with liquid refrigerant. Use the special recharging equipment (normally on the market) to control the refrigerant correctly.

IMPORTANT
Any works carried out on the refrigerant circuit must be undertaken by a person holding the relevant Fgas certification

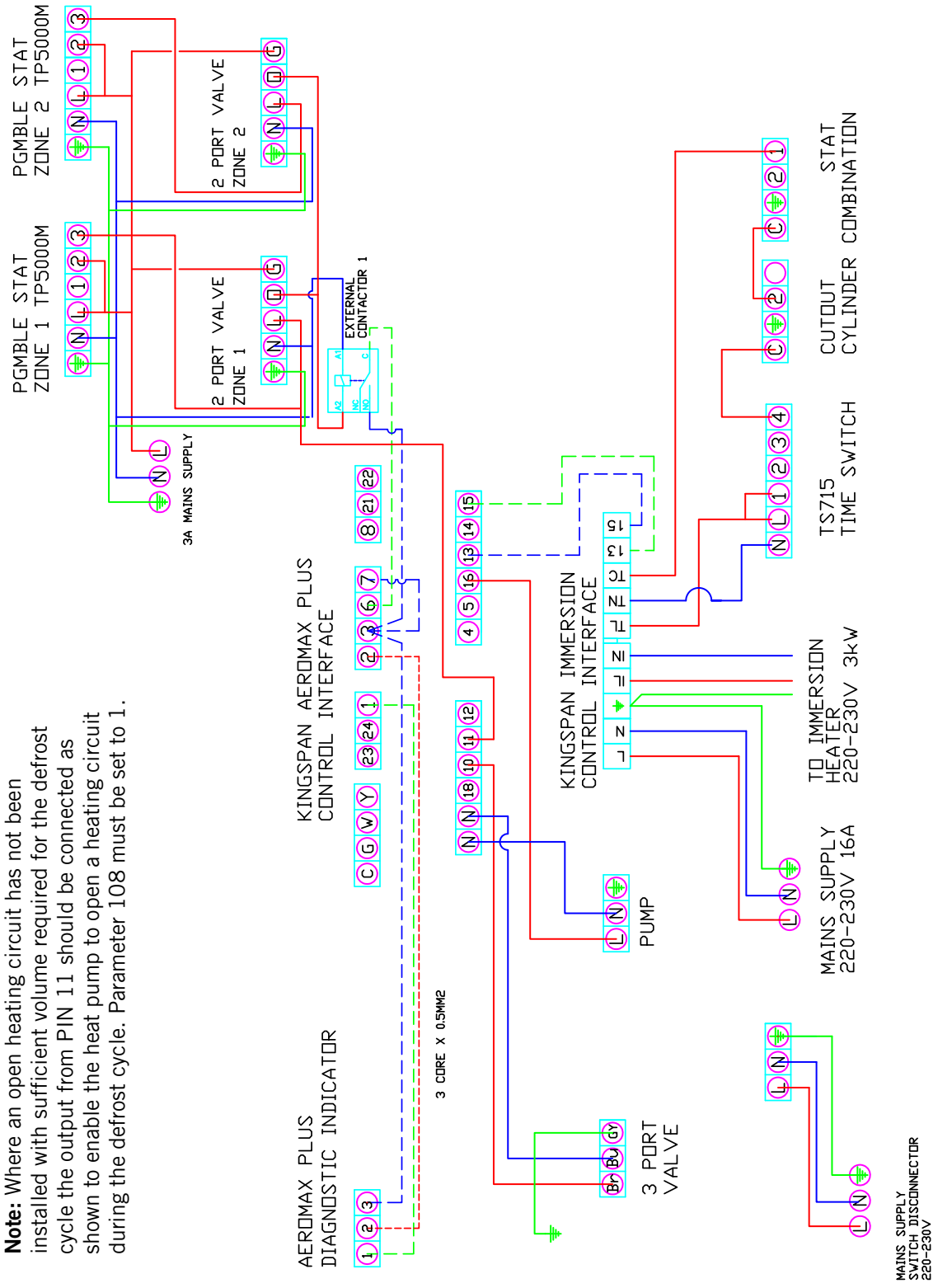
Additional Systems: Twin Zone System.

Water connections



Note: Where an open heating circuit has not been installed or where the system flow rate falls below the minimum required level when the zone valves close a bypass valve must be installed.

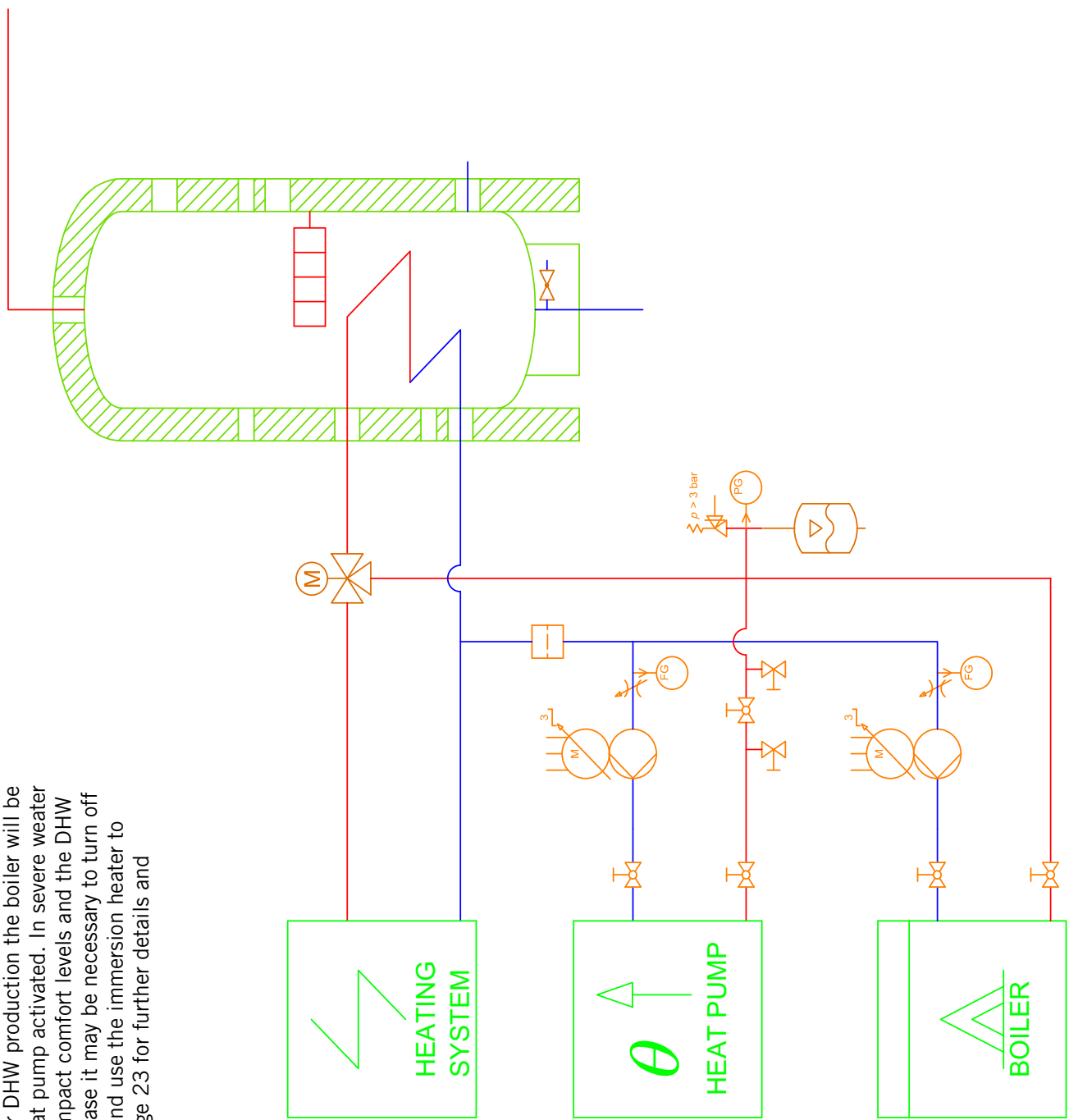
Wiring Diagram



Note: Where an open heating circuit has not been installed with sufficient volume required for the defrost cycle the output from PIN 11 should be connected as shown to enable the heat pump to open a heating circuit during the defrost cycle. Parameter 108 must be set to 1.

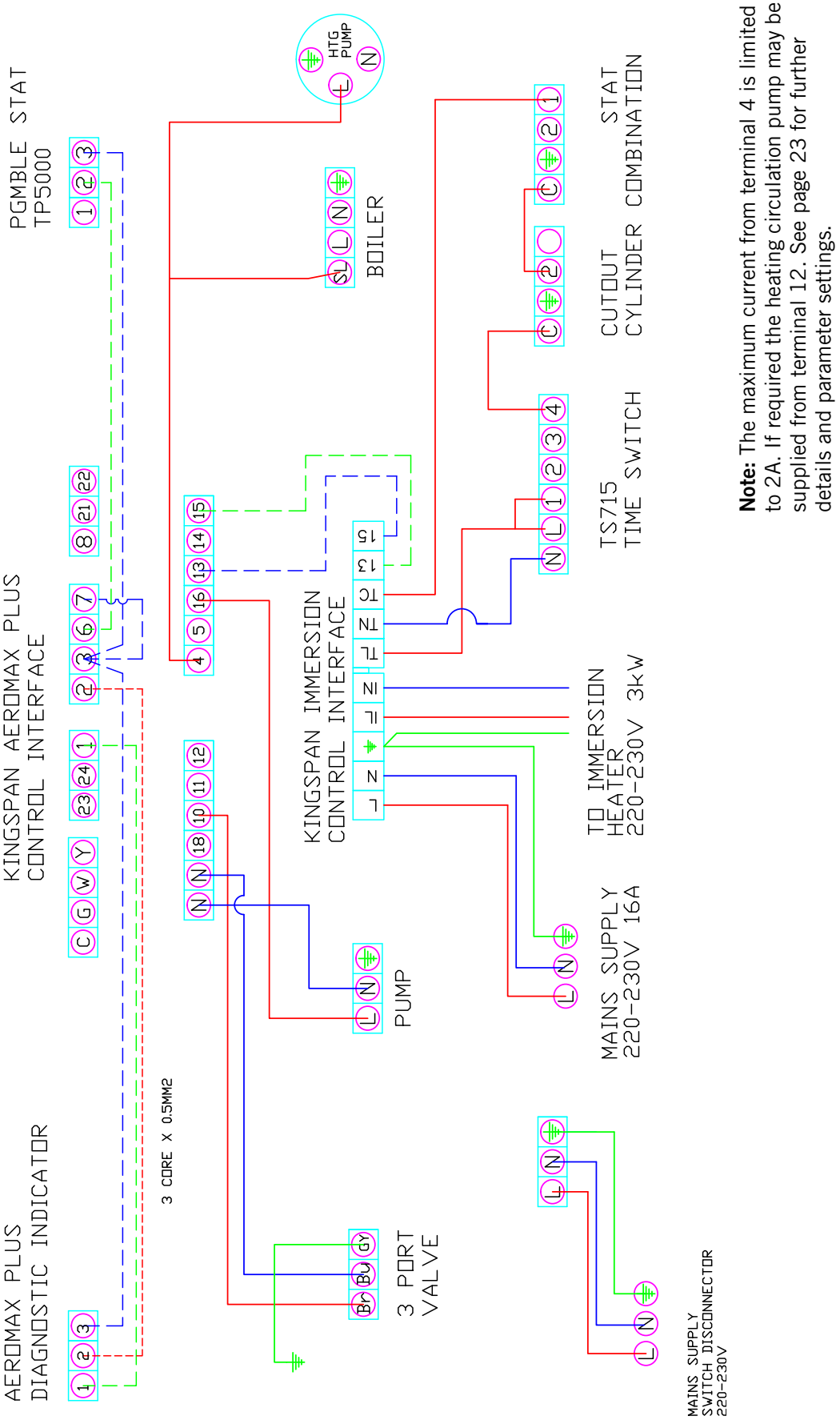
Additional Systems: Bi-Valent Alternative System (Boiler).

Water connections



Note: On a request for DHW production the boiler will be turned off and the heat pump activated. In severe weater conditions this may impact comfort levels and the DHW temperature. In this case it may be necessary to turn off the DHW time clock and use the immersion heater to provide DHW. See page 23 for further details and parameter settings.

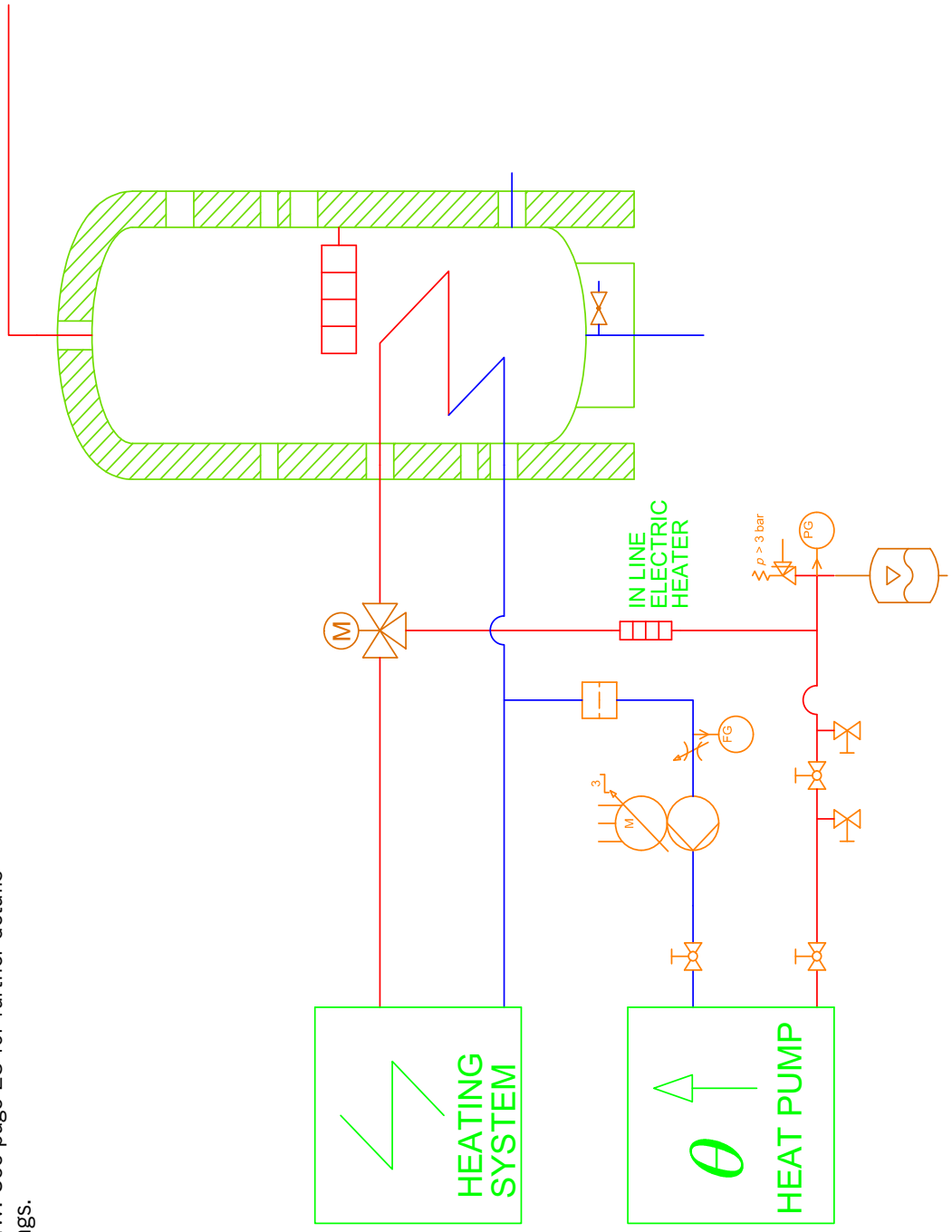
Wiring Diagram



Note: The maximum current from terminal 4 is limited to 2A. If required the heating circulation pump may be supplied from terminal 12. See page 23 for further details and parameter settings.

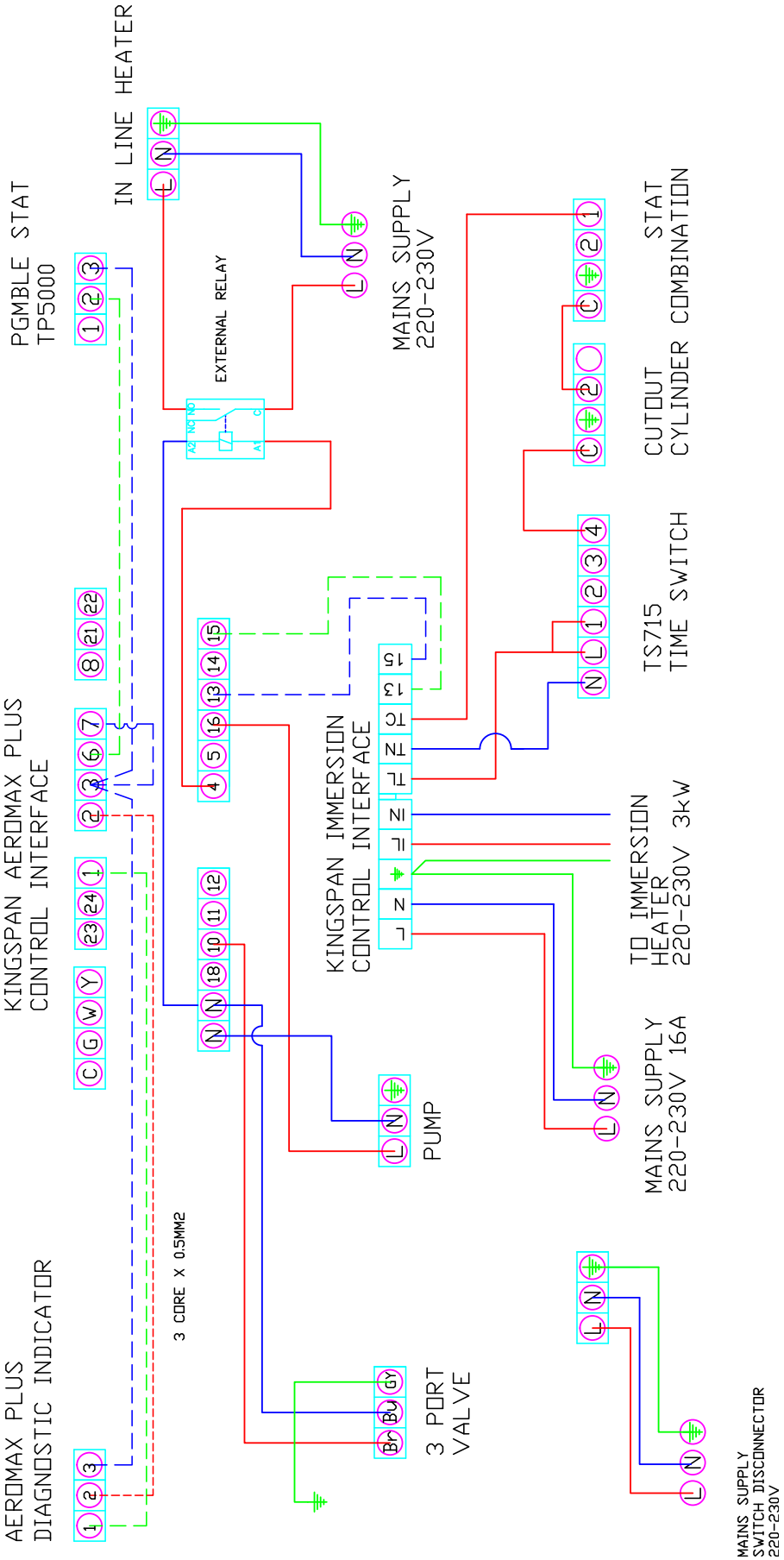
Additional Systems: Bi-Valent Parallel System (In-line Electric Heater)

Water connections

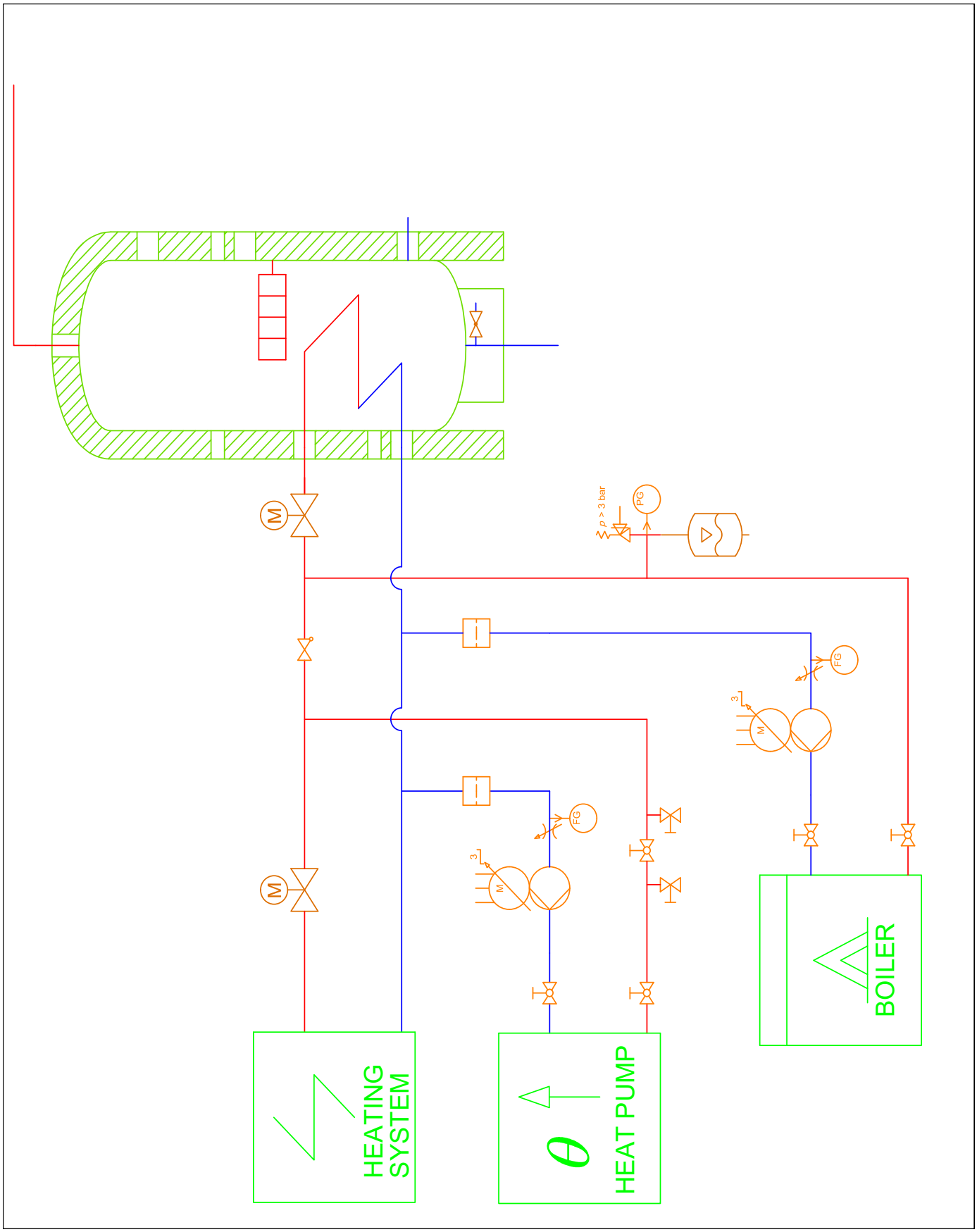


Note: On a request for DHW production the Inline heater will be turned off and the heat pump activated. In severe weater conditions this may impact comfort levels and the DHW temperature. In this case it may be necessary to turn off the DHW time clock and use the immersion heater to provide DHW. See page 23 for further details and parameter settings.

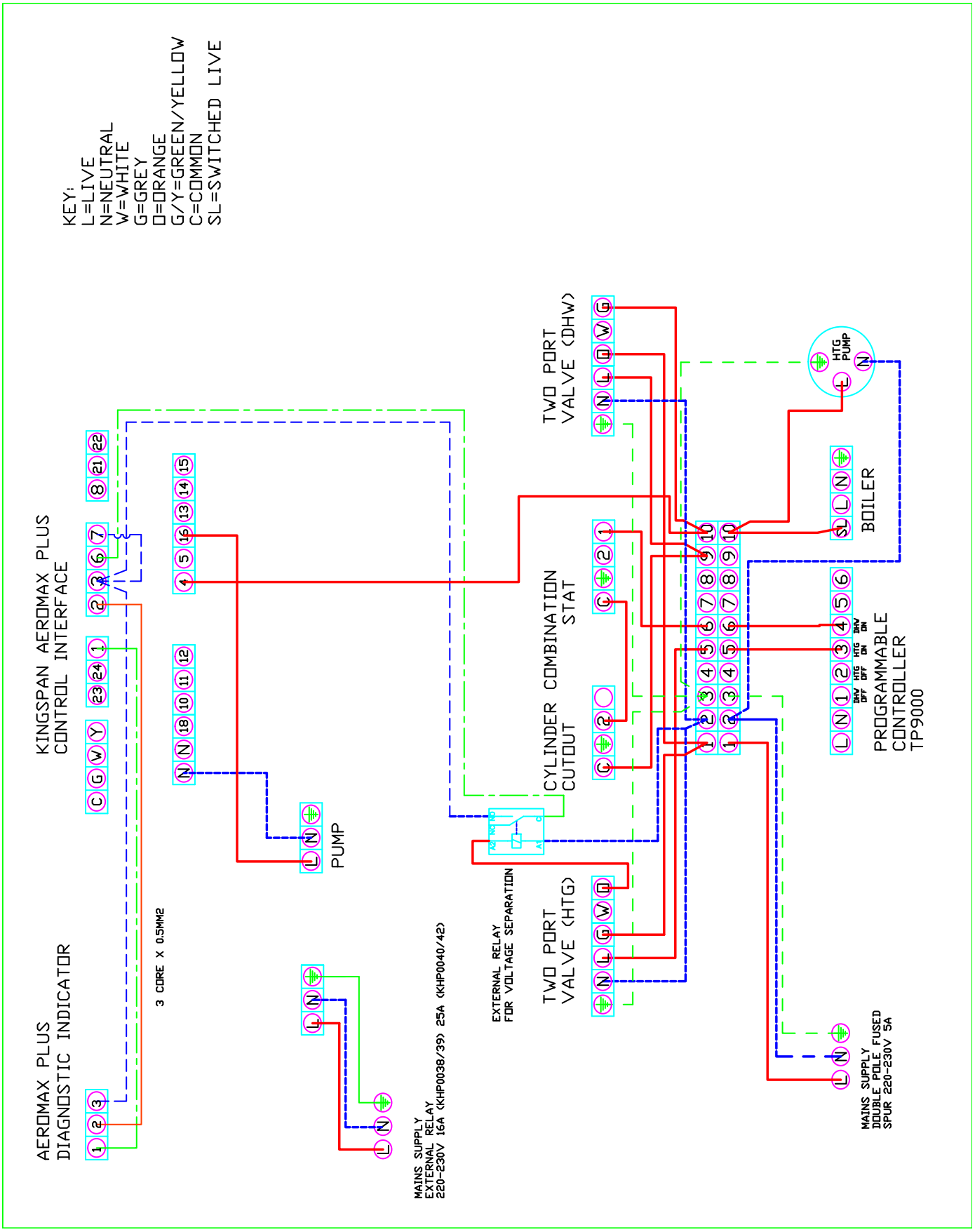
Wiring Diagram



Water connections



Wiring Diagram



Installation Pack

7 day hot water programmer

Please see page 43 for full instructions

Programable room stat

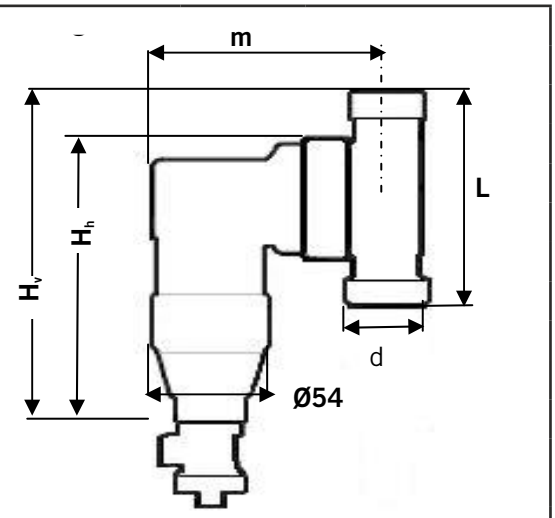
Please see page 55 for full instructions

2 x 750mm flexible hoses including 90°elbow, pre-insulated

Used to connect flow & return pipes to heat pump and reduce vibration

1 x system filter

Design parameters:	
Medium:	Water / glycol (max.50%)
Max. Flow velocity:	1 m/s
Max. volume:	0.30 l/s
Max. System pressure:	6 bar-g
Max. temperature:	110 ℃
Design rules:	Standard
Quality rules:	
Leakage tests	yes
Testing certificate:	no
Design and Production according 97/23/EC:	yes
Material certificates:	no
Drawing:	yes



Construction materials		Dimensions:		
Housing	brass	d	22	mm
Connection nut	brass	H_v	167	mm
Swivel h/v	brass	H_h	149	mm
Drain ball valve	brass	L	100	mm
Spiro-tube:	core-tube - copper	m	102	mm
	wiring - copper			
	solder - tin(SnCu3)	Volume:	0.18	ltr
Magnet:	ferrite			
Weight (empty) appr.	1.44 Kg	Rights of modification reserved		

Installation Pack

System Antifreeze / Inhibitor - Clear

- Protects against frost damage from -14°C to -34°C
- Protects against corrosion, limescale and bacterial contamination
- Non-toxic
- Compatible with all metals and materials commonly found in heat

Application

Fluid Plus is a concentrated heat transfer fluid capable of frost protection from -14°C to -34°C especially formulated for use in Heat Pumps. Fluid Plus also provides long term protection from damage caused by corrosion, limescale and bacteria and maintains a stable pH across a range of operational temperatures. Fluid Plus is compatible with all materials commonly used in Heat Pumps.

Instructions for use

Dilute before use using mains water. In order to ensure adequate corrosion and biocidal protection, the minimum In-use' concentration of the product is 33%. Maximum 'in-use' concentration is 50%. Upon dilution Fluid Plus will provide frost protection according to the table below.

Concentration	33%	40%	50%
Frost Protection	-14℃	-22℃	-34℃

Existing heating systems should be cleaned of sludge and limescale deposits before using a suitable Heat Pump cleaner before adding Fluid Plus.

Health and safety

Fluid Plus is non hazardous but as with all chemicals, care should be taken. If swallowed seek medical advice and show container or labels. Do not mix with other chemicals. Keep out of reach of children. Safety data sheets available on request.

2 x Full bore isolating valve with lever

To be installed on end of flexi hose so that the unit can be isolated without the need to drain the system completely

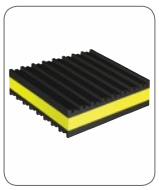
Flow Setter

Installed on the return pipe work after the pump allowing 200mm gap between them to avoid turbulence (which may give false readings)

Flush & Fill

Install on flow pipework to assist in easy filling of system

Anti vibration pads

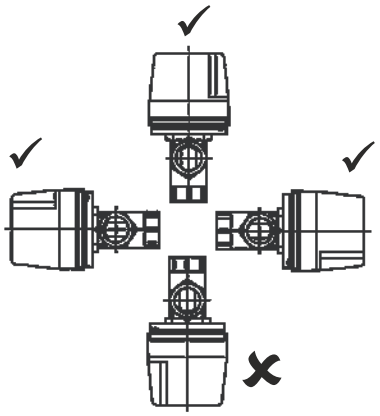


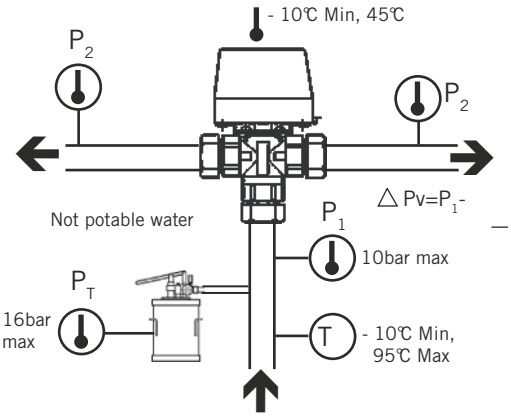
Installed under feet of the unit. Designed to withstand extremely high loads & reduce noise.
Dimensions L 76mm x W 76mm x D 22.2
Weight = 100g

W Plan diverter valve (heat pump specific)

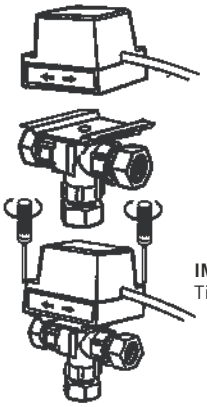
Operating voltage	230VAC
Switch current rating	3 (1) A
Switch action	Type 1B
Max temperature	45℃
Enclosure rating	IP40
Pollution situation	Degree 2
Ball pressure temp	75℃
Open/close time	30/10 sec
Rated impulse voltage	2.5K
Cord attachment	Solder 2 crimp

3.0 Installation





4.0 Assembly

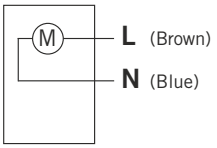


IMPORTANT
Tighten evenly

Size	Kv (M3/h)	ê Pv (bar)	Type
22mm	6.1	1.0	HSA3ND
	6.8		
28mm	7.9	0.7	

Electrically operated valve - Not for use with potable water

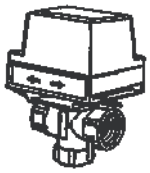
2.0 Wiring - HSA3ND



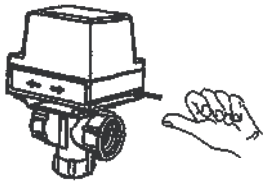
* Shown de-energised

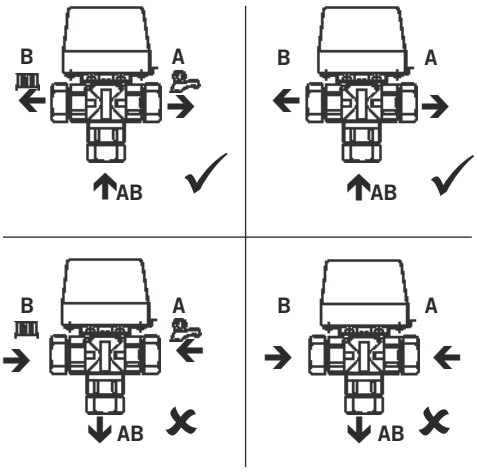
5.0 Operation

Auto



Manual





IMPORTANT NOTE:

Port A to hot water
Port B to heating

Diagnostic Indicator

Read the following instructions before starting the installation.

This product is a Diagnostic Indicator for Aeromax Plus heat pump models. It indicates the alarm and power status ofthe Aeromax Plus unit.

It must be connected to the Aeromax Plus unit for correct operation.

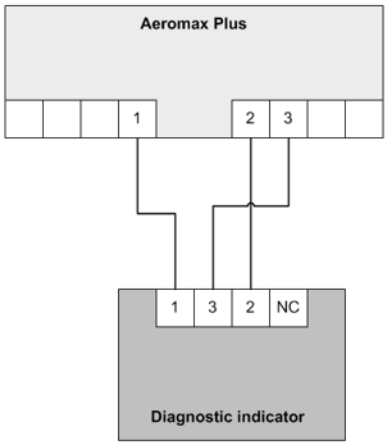
Technical specification

Dimensions	120mm (w) x 80mm (h) x 55mm (d)
Material	Polycarbonate
Ambient temperature	-25℃ to +70℃
Nominal supply voltage	12V DC
Maximum supply voltage	20V DC
Cable	Minimum 0.5mm2, 3 core, shielded

Electrical connection

Before connecting any wiring to the diagnostic indicator, turn the Aeromax Plus unit power off.

Use a minimum of 3 core cable to connect the diagnostic indicator to the Aeromax Plus unit. Refer to the wiring diagram below. If shielded cable is used the shield should be grounded only on the Aeromax Plus terminal strip (terminal no.3).



Diagnostics

Power LED (green) indicates that the Aeromax Plus unit is powered ON.

Alarm LED (red) indicates when an error occurs. The error code can be identified from the flashing LED using a fault code table. Refer to the Aeromax Plus Installation Manual for the alarm code explanation.

Troubleshooting

Problem	Likely cause	Solution
Power LED off	1) Aeromax Plus unit is off	1) Check that the Aeromax Plus power is connected.
	2) Wires connected incorrectly	2) Switch the Aeromax Plus unit off Check the wires.
	3) There is no 12V coming from the Aeromax Plus unit	3) Check the connection on the Aeromax Plus unit.
Wiring is correct and 12V applied to the diagnostic indicator but the LEDs are OFF.	1) Diagnostic indicator is damaged	1) Replace the diagnostic indicator

Immersion Heater Controller

Read the following instructions before starting the installation.

This product is an Immersion Heater Controller for Aeromax Plus heat pump systems. It is installed to control the operation of the immersion heater to sanitise the Domestic Hot Water cylinder to prevent Legionella growth. The Immersion Heater Controller is used in conjunction with the 7 Day Hot Water Programmer to determine the day(s) and times for sanitisation.

Technical specification

Dimensions	180mm (w) x 110mm (h) x 87mm (d)
Material	Polycarbonate
Ambient temperature	-25℃ to +70℃
Nominal supply voltage	220V - 240V AC
Maximum supply current	16A

Electrical connection

Please refer to the electrical connection diagram on Page 21.

Operation

The operation of the immersion heater controller is determined by the time setting in the 7 day hot water programmer T_{on} and the internal timer relay delay T_r. The diagram shows the possible operating sequences.

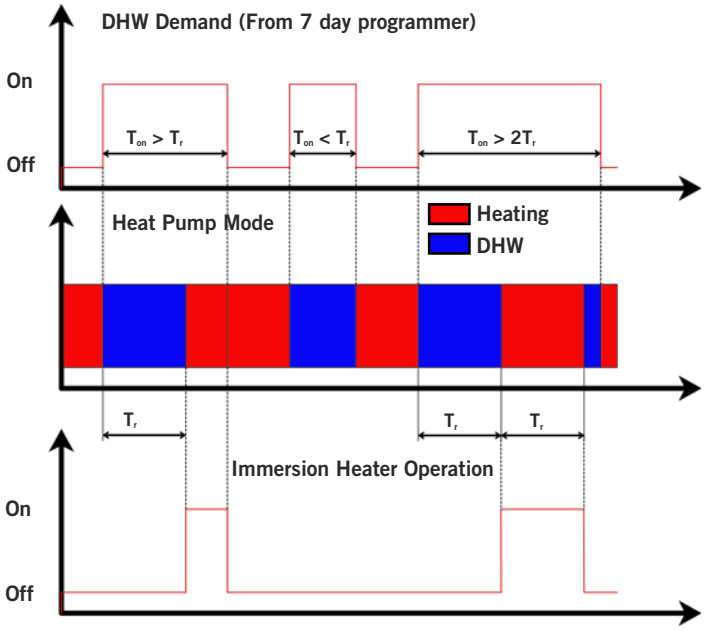
In part 1 of the DHW demand program T_{on} is greater than T_r. In this case the heat pump will run in DHW mode for T_r minutes. The heat pump will then revert to heating mode and the immersion heater will operate for the remaining time (T_{on} - T_r).

In part 2 of the DHW demand program T_{on} is less than T_r. In this case the heat pump will run in DHW mode for T_{on} minutes. The heat pump will then revert to heating mode. In this case the immersion heater will not operate.

Part 3 of the DHW demand program shows the effect if T_{on} is greater than $2T_r$. In this case the heat pump will run in DHW mode for T_r minutes. The heat pump will then revert to heating mode and the immersion heater will operate for T_r minutes also. The heat pump will then return to DHW mode. This type of operation is not recommended and timings for T_{on} should set as for those in part 1 & 2.

The default setting for T_r is 50 ± 3 minutes. Please refer to the Homeowners Guide for recommended settings for T_{on} on the 7 day programmer.

Note: the immersion heater will be deactivated when the DHW cylinder temperature rises above the setting of the internal immersion heater thermostat.



Optional Installation Accessories

Filling station

C0814 filling station.

The Kingspan Flushing & filling station aids the installer when commissioning the heating system. It can be connected directly to the flush and fill port supplied in the installers pack which in turn is then filled with the Kingspan antifreeze / inhibitor concentrate.

Wall mounting bracket & condensate

KHP0013 Wall bracket 90kg (fits 4kW, 6kW & 8kW units)
KHP0014 Wall bracket 140kg (fits 12kW & 15kW units)
KHP0016 Condensate tray for 4kW, 6kW & 8kW units
KHP0017 Condensate tray for 12W & 15kW units

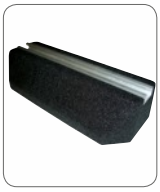
Protective cage

KHP0011 Guard for 4kW, 6kW & 8kW units
KHP0012 Guard for 12W & 15kW units

Advanced programmable controller

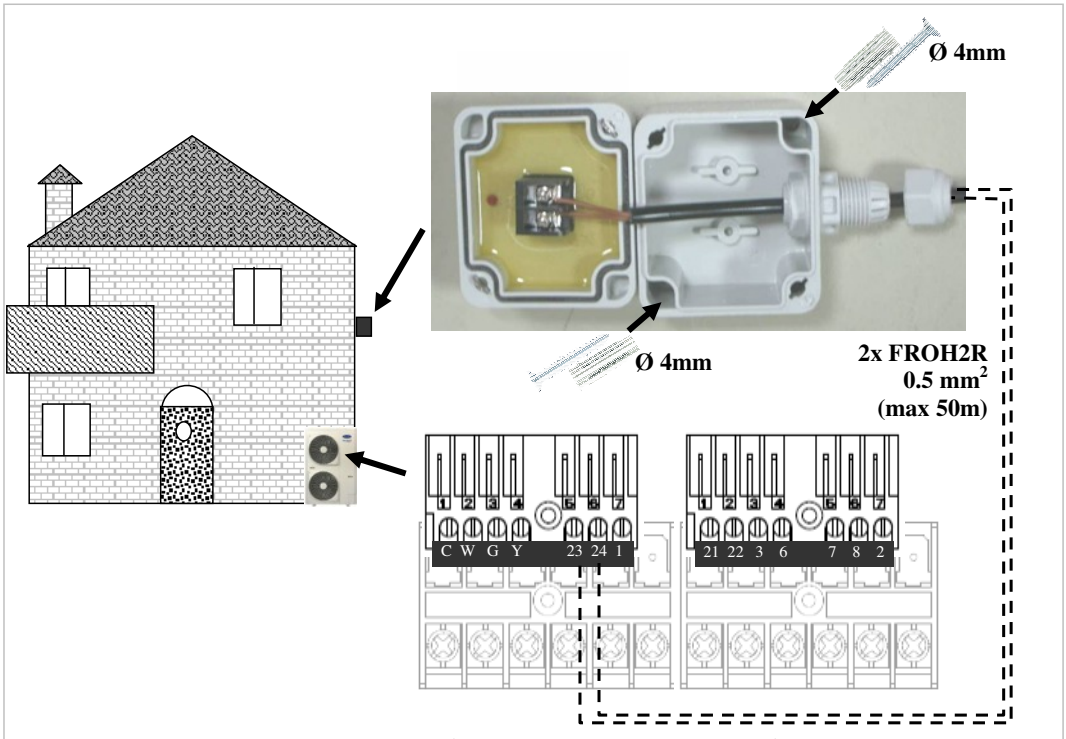
KHP0008 Aeromax Plus advanced programmable controller. Required for changes to factory parameter settings.

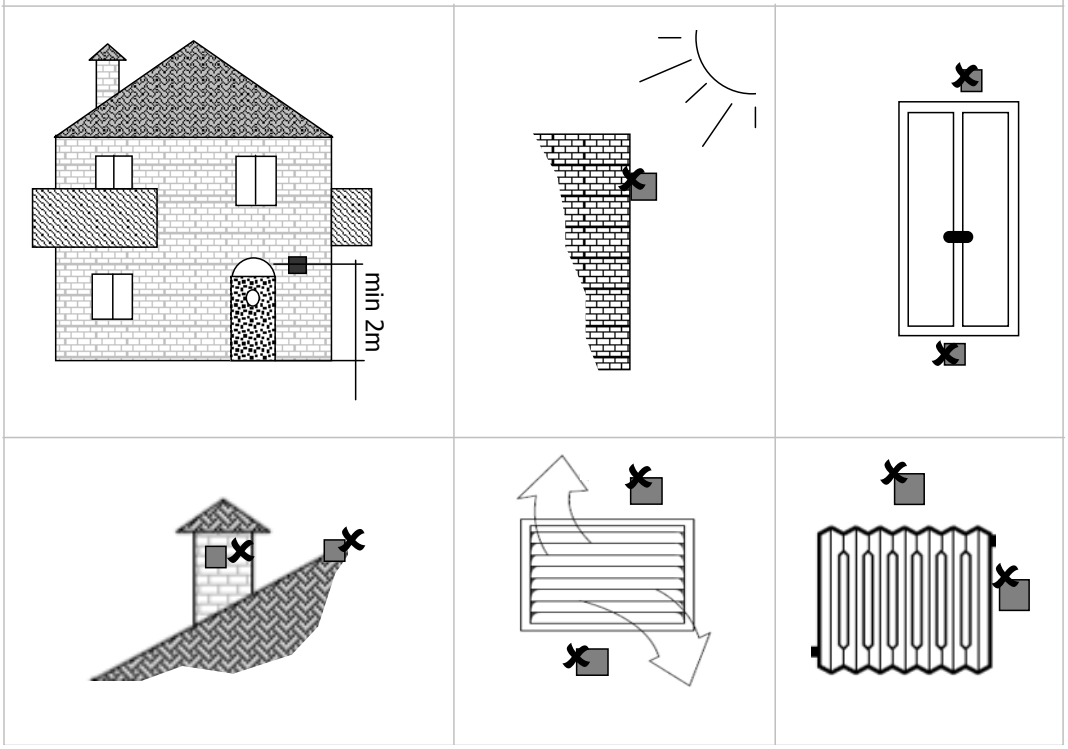
Anti-vibration foot



KHP0044 Installed under feet ofthe unit. Designed to withstand extremely high loads & reduce noise

External Temperature Sensor KHP0009

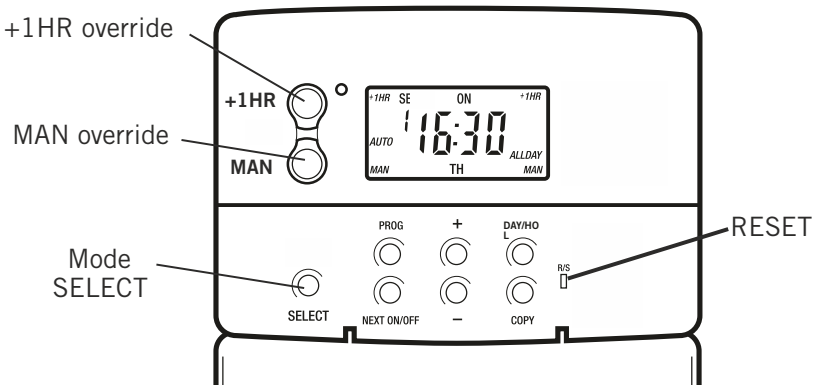




X = unsuitable location

7 day hot water programmer

Installation & User Instructions



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Please Note:
This product should only be installed by a qualified electrician or competent heating installer, and should be in accordance with the current edition ofthe IEEE wiring regulations.

Product specification

Specification	230V Model	24V Model
Power supply	230 Vac, ±15%, 50/60 Hz	24Vac, ±15%, 50/60Hz
Switching action	1 x SPDT voltage free, Type 1B	
Switch rating	24 - 230 Vac, 3(1)A	
Battery back-up	24 hours minimum	
Setting/Running Accuracy	±1 minute	
Dimensions, mm (W, H, D)	135 x 88 x 32	
Design standard	EN 60730-2-7	
Control Pollution Situation	Degree 2	
Rated Impulse Voltage	2.5kV	
Ball Pressure Test	75℃	

7 day hot water programmer

Installation

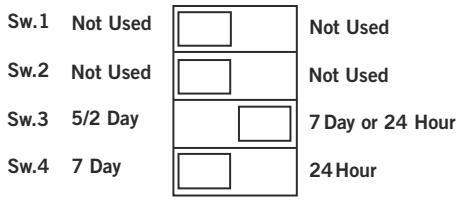
- Remove wallplate from unit by unscrewing the two screws on the bottom edge of the unit.
- From the top left hand corner of the wallplate, there must be clearances of at least 140 mm to the right, 15mm to the left, 30mm above and 100mm below in order to mount the plug-on module.
- The wallplate must be securely mounted either directly to the wall using suitable wood screws or to a flush mounted 1-gang electrical accessory box using M3.5 screws.
- Cable access can either be from behind for concealed cabling, or from below for surface cabling. If surface cable is used, cut out cable access slot on plug-on module prior to mounting the module.
- For wiring connections refer to the diagrams.
- TS715-Si models are double insulated and do not require an earth connection, however a parking terminal is provided on the wallplate. This is clearly marked with an Earth symbol.
- Prior to mounting the plug-on module, DIL switches on the rear of the plug-on module must be set. See diagram below for available options.
- Mount plug-on module to wallplate by locating tabs on top of wallplate in apertures on rear of module, hinge down and press firmly to wallplate before tightening securing screws on bottom of wallplate. Before mounting the unit, ensure the 4 DIL switches on the rear have been moved to the required settings.

Wiring - See page 21 for further details

Please Note:
Always switch off mains first and never fit programmer to a live wallplate.

DIL Switch Settings

Before mounting the unit, ensure the 4 DIL switches on the rear have been moved to the required settings.



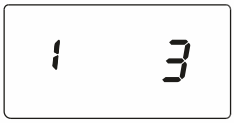
Tick the INSTALLER SETTING box on the inside flap label to notify user in which mode their unit is set (24hr, 5/2 day or 7 day).

INSTALLER SETTING	
24Hour	
5+2 Day	
7 Day	

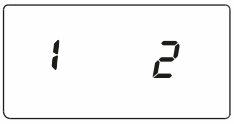
Advanced Programming Options

To enter advanced programming press PROG, + and DAY/HOL together and hold for 5 seconds.

Option 1 - (3 or 2 On/Off's per day)
Use + or - to change between 3 and 2 on/off 's each day.



3 on/off's each day (Factory setting)



2 on/off's each day

Option 2 - (Disable or enable auto time change)
Press NEXT, then use + or - change between auto time change enabled and auto time change disabled

Auto time change enabled (Factory setting)

Auto time change disabled

Option 8 - (Advanced Copy Functions)
Press NEXT, then + or - to change between the following copy options:

(0) Standard copy in 7 day and 5+2 day.
(1)Enhanced copy in 7 day, standard copy in 5+2 day
(2)Enhanced copy in 7 day, AB copy in 5+2 day.
For an explanation of the copy features and how to use them please see copy functions explained section below.

Press **PROG** to return to **RUN**.

Copy Functions Explained

There are 3 possible copy functions available. These are; Standard Copy, Enhanced Copy, and AB copy. Copy functions are enabled/disabled in the Advanced Programming Options (above).
Standard Copy: Pressing copy will copy the previous days events into the displayed day. The unit will then display the 1st event for the new day. This copy function is present only if the unit is set to run in 5+2 or 7 day mode.
Enhanced Copy: The enhanced copy function is available in 7 day mode only. This allows any day to be copied to any other day, or days. To use the enhanced copy function go into the event programming using the PROG button, then:

1. Use the DAY button to find the day to be copied from.
2. Press the COPY button to select the day to be copied from.

When selected, the day should begin to flash.

3. Use the DAY button to find the day to be copied to.
4. Press COPY button to copy the selected day.
5. Repeat steps 3 and 4 to select and copy other days.
6. To stop copying, use the DAY button to go back to the flashing day and press the COPY button. The previously flashing day will stop flashing to indicate it has been

Please Note:
When a day has been copied to, it will remain visible and not flashing when the DAY button is used to select other days.

7 day hot water programmer

Copy Functions Explained

AB Copy: The AB copy function is available in 5+2 mode only and only if activated in the Advanced Programming setting.

A and B days, when selected, can be any group of days e.g. 5+2, 4+3 etc. The days do not have to run in sequence. For example, to operate in a 5+2 day mode the days can be set as follows:

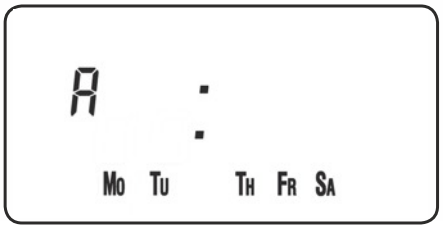
A Days	B Days
Mon Tues Thurs Fri Sat	Wed Sun

To use the AB copy function – press the PROG button:

1. This will show the "A" days, with all the days selected.
2. Use the DAY button to highlight a day.
3. Subsequent presses of the DAY button will increment through the days.
4. Press the + button to select a specific day as an "A" day, or press the – button to specify a day as a "B" day.
5. Once the day has been selected as an "A" or "B" day the programme will automatically jump to the next day.
6. When the last day of the week is active, pressing +, -, or DAY will move back to the "A" days displayed with no selected (flashing) days (see image below).
7. Repeat 2 to 6 until all selections have been made.
8. When selections are completed, press the PROG button to move to event programming.

Event Programming in AB mode

1. Programme "A" day events using the + (time advance), - (time decrease), and NEXT (next period) buttons.
2. Press the DAY button to change to programme the "B" days
3. Programme "B" day events using the + (time advance), - (time decrease), and NEXT (next period) buttons.



Service Interval Timer

The TS715 Si is fitted with an installer setback service interval timer. If this feature is required please contact our technical department. Setting instructions for this gas safety feature are only available to bona fide heating installers.

What is a programmer?

... an explanation for householders.

Programmers allow you to set On' and Off ' time periods. Some models switch the central heating and domestic hot water on and off at the same time, while others allow the domestic hot water and heating to come on and go off at different times.

Set the On' and Off' time periods to suit your own lifestyle. On some programmers you must also set whether you want the heating and hot water to run continuously, run under the chosen On' and Off ' heating periods, or be permanently off.

The time on the programmer must be correct. Some types have to be adjusted in spring and autumn at the changes between Greenwich Mean Time and British Summer Time.

You may be able to temporarily adjust the heating programme, for example, 'Override', 'Advance' or 'Boost'. These are explained in the manufacturer's instructions. The heating will not work if the room thermostat has switched the heating off. And, if you have a hot-water cylinder, the water heating will not work if the cylinder thermostat detects that the hot water has reached the correct temperature.

Please Note:
Please note: A timeswitch is a single channel programmer. It will allow you to set your system's On and Off periods.

7 day hot water programmer

Your timeswitch

The TS715-Si allows you to switch your system on and off at times that suit you.

You can programme up to 3 separate ON/OFF times per day.

Preset Programmes

Your TS715-Si comes ready programmed with a set of operating times which often suit most people.

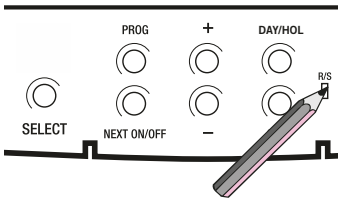
If you want to change any of these settings, you can do so by following the instructions on pages 48-51. First, follow the steps below and on page 48 to set the correct time and date.

"Event No."	"Hot Water & Heating"	Mon-Fri	Sat-Sun**
1	1st ON	06:30	07:30
2	1st OFF	08:30	10:00
3*	2nd ON*	12:00*	12:00*
4*	2nd OFF*	12:00*	12:00*
5	3rd ON	17:00	17:00
6	3rd OFF	22:30	22:30
"* Not applicable if unit set to 2 ON/OFFs per day by installer **Not applicable if unit set to 24 hour mode by installer See page 48 for explanations of different settings"			

Before you start

Open the flap on the front of the clock. Press the RESET button using a non-metallic object (e.g. Pencil/matchstick) until you hear a click and the red light on the front of the unit comes on and the LCD goes blank.

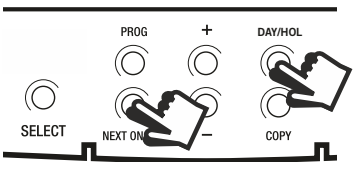
This will reinstate the preset programmes and sets correct day and time.



To fully reset the unit see page 54.

Choice of 24hr or AM/PM display

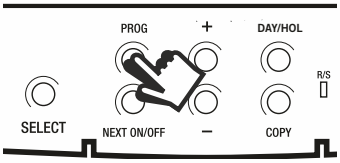
Press and hold DAY/HOL & NEXT ON/ OFF for 2 seconds to toggle between 24hr clock and AM/PM display, as required.



7 day hot water programmer

Setting the correct Time and Day

These settings are made during manufacture and only need to be made in the unlikely event that the unit has lost the settings.



Setting the Date
Press and hold **PROG** for 5 seconds to display year.
Use the + or - buttons to set the correct year.

Press **DAY/HOL** to display day and month. Use the + or - buttons to set the correct month (Jan = 1, Feb = 2 etc.).

Press **DAY/HOL** to display day and month. Use the + or - buttons to set day of month.

Press **PROG** to display the time.

The words **SET TIME** will appear at the top of the display & the time will flash on and off .

Use the + or - buttons to set the correct time (press and hold to change in 10 min. increments).

Setting the Day
The day of the week is set automatically.

Accepting the preset programmes

If you are happy to use the preset programmes on page 47, you don't need to do anything else.

To accept the factory presets just press the PROG button once until the time appears and colon in the display begins to flash.

Your unit is now in RUN mode and will control your heating

Before you change the preset programmes

Your installer will have set your unit to operate in one of the following modes:

- 5/2 day - one set of programmes for weekdays and another for weekends (page 49)
- 7 day - different settings for each day of the week (page 50)
- 24 hour - one set of programmes for the whole week (page 51)

See INSTALLER SETTING tick box on inside flap label to ascertain which mode your unit is set.

Please Note
The unit must be programmed in sequence and ON/OFF times cannot be set out of sequence.

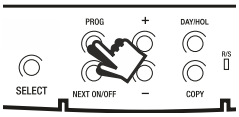
If you want to leave a preset time as it is, simply press NEXT to move on to the next setting.

Your installer will have set your unit to programme either 2 or 3 ON/OFFs per day. If your clock has been installed to allow 3 ON/OFFs and you do not wish to use one of the ON/OFF settings, simply programme the ON time to be the same as the OFF time and the setting will not operate.

Programming the ON/OFF Times in 5/2 day mode

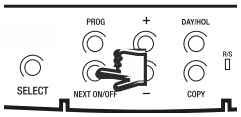
1. Press PROG once until SET ON TIME appears at the top of the display and MOTUWETHFR appears at the bottom of the display.

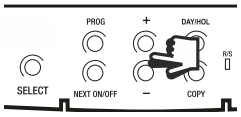
Use the + or - buttons to set the time you would like your system to first come on in the morning (Event 1).



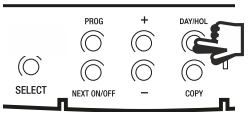
2. Press NEXT ON/OFF once only.

Use the + or - buttons to set the time you want your system to go off (Event 2). To move to the next setting, i.e. when you would like your system to come on again (Event 3) press the NEXT ON/ OFF button again.

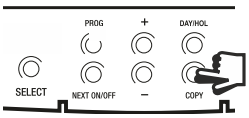




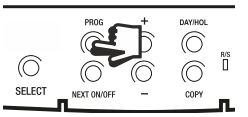
3. Continue programming system ON and OFF times for weekday Events 4, 5 & 6 as in Step 2.



4. Press the DAY/HOL button once and SASU will appear at the bottom of the display.



5. To set the times required for SA and SU repeat steps 1 to 3 or if the same settings are required press COPY.

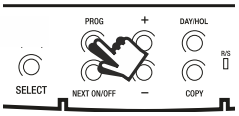


6. Press the PROG button once to return the unit to RUN mode (time appears & colon in the display begins to flash).

7. Proceed to bottom of page 51.

Programming the ON/OFF Times in 7 day mode

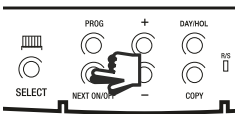
1. Press PROG once until SET ON TIME appears at the top of the display. Note the current day is displayed. Press the DAY/ HOL button until the required day is displayed.



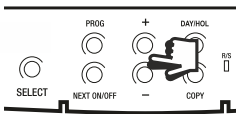
Use the + or - buttons to set the time you want your system to first come on in the morning (Event 1).

2. Press NEXT ON/OFF to move to Event 2.

Continue programming the system ON and OFF times in this way by using the + or - buttons to set the time you want and pressing the NEXT ON/OFF button to move to the next setting.



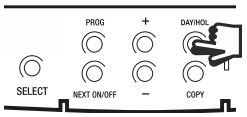
3. Press DAY/HOL button once only. The next day will appear at the bottom of the display.



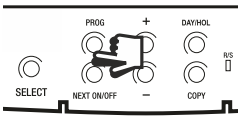
Continue programming the rest of the week by pressing:
a) NEXT ON/OFF button to move to the next setting,

b) + or - buttons to amend the time,

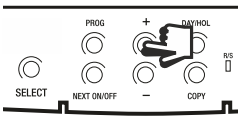
c) DAY/HOL to advance to the next day.



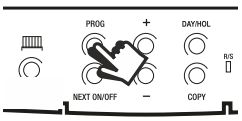
d) To copy the previous day press the COPY button.



4. Press the PROG button to return the unit to RUN mode (time appears & colon in the display begins to flash).



5. Proceed to bottom of page 51.



Programming the ON/OFF Times in 24 hour mode

1. Press PROG once until SET ON TIME appears at the top of the display.

Use the + OR - buttons to set the time you want your system to first come on in the morning (Event 1).

2. Press NEXT ON/OFF to move to Event 2.

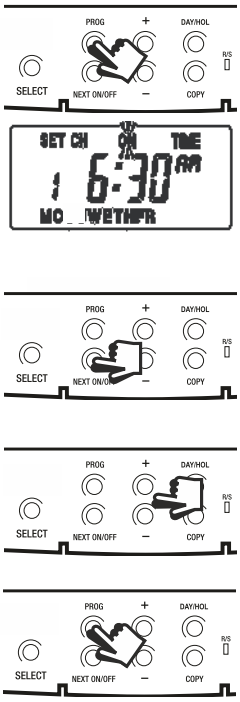
Continue programming the system ON and OFF times by pressing:

a) NEXT ON/OFF button to move to the next setting,

b) + or - buttons to amend the time,

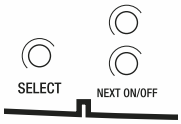
3. Press the PROG button to return the unit to RUN mode (time appears & colon in the display begins to flash).

4. Proceed as below.



Running your Programme

To run the programme:
press the SELECT



Each time you press the SELECT button the display will change between ON, OFF, ALLDAY and AUTO.

- **AUTO** = the system will come on and go off at the programmed times.
- **ON** = the system will remain on constantly.
- **OFF** = the system will not come on.
- **ALLDAY** = the clock will turn the system on at the first programmed ON and will leave it on until your last programmed OFF.

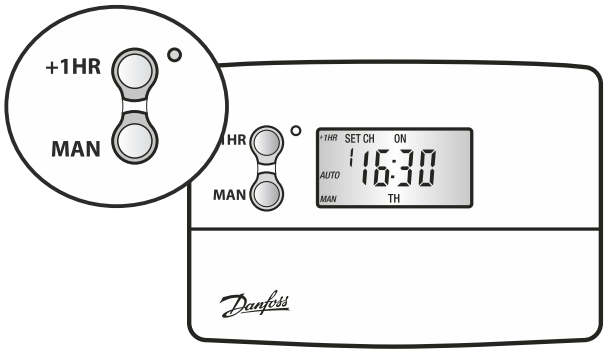
Select the option you require depending on your circumstances, time of year, etc.

Temporary override buttons

Sometimes you may need to change the way you use your heating temporarily, i.e. due to unusually cold weather. The TS715 Si has two convenient overrides which can be selected without affecting the set programme.

+1HR = pressing this button when the unit is in AUTO or ALLDAY mode will cause the system to remain on for an extra hour. If it is pressed while the unit is OFF, the system will come on immediately for 1 hour then go off again. +1HR will be shown in the display.

MAN = pressing this button when the unit is in AUTO or ALLDAY mode will cause the system to go OFF until the next programmed ON, or vice versa. MAN will be shown in the display.



Holiday Programme

To automatically bring the heating back on when returning from holiday the TS715 Si has a built in holiday feature. Follow the steps below to set the date that the heating system needs to come back on.

1.Press DAY/HOL

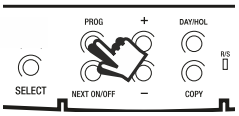
2.Use the + or - buttons to select the year.

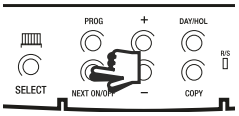
3.Press DAY/HOL, then use the + and - buttons to select the month.

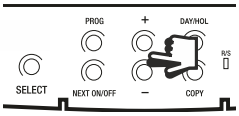
4.Press DAY/HOL again, then use the + and - buttons to select the day in month.

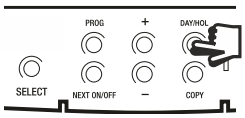
5.Press DAY/HOL to turn heating off and enter holiday mode.

To cancel holiday mode press DAY/HOL.









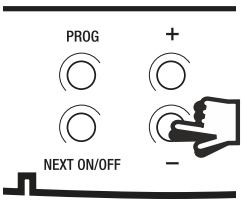
Changing clocks forward & back

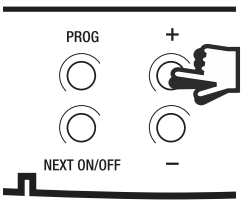
This is handled automatically. Should the installer have turned off Automatic Time Change then follow the instructions below.

Open the flap on the front of the unit to reveal the programming buttons.

To change from Summer to Winter (clocks back) -
- **press and hold - button**

To change from Winter to Summer (clocks forward) -
- **press and hold + button**





Please Note
After the first time this change has been made this feature will only allow the clock to be changed in the opposite direction.

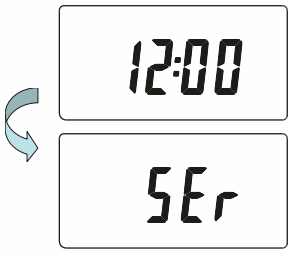
Take care when making this change for the first time. If it is made in the wrong direction the unit will have to be reset and any user-settings re-entered

(see pages 47 & 48 on how to Reset the unit and how to set the Time and Day).

Service Interval Timer

If the property is owned by a landlord he may, for gas safety reasons, have instructed the installer to set the service interval timer.

If set, 28 days prior to the boiler service due date, a momentary visual and audible warning will remind you to have the boiler serviced in the next 28 days. This will be repeated each day at noon.



If the boiler is not serviced within 28 days the daily audible warning will sound for 1 minute at the beginning of each hour and must be cancelled each day by pressing any button on the unit.

- In addition, all overrides and programming buttons will be disabled and the heating and hot water will operate for a set portion of each programmed hour.
- The installer will cancel or reset the service interval timer as part of the boiler service.
- This is a gas safety feature that can only be accessed by an installer.
- When the service interval timer is set the service due date can be viewed in RUN mode by pressing and holding the COPY button.

Making a Full Reset

If it is necessary to fully reset the unit, including the date and time, follow the instructions below.

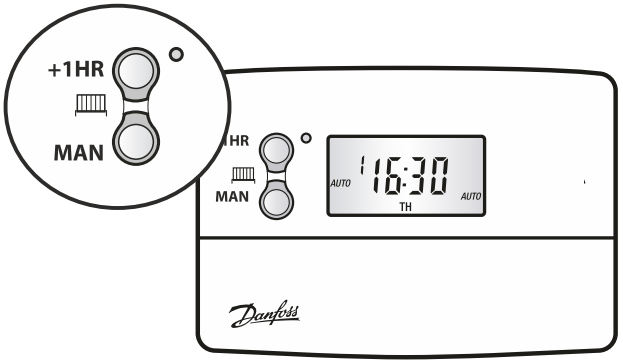
1. Press and hold the +1HR and MAN buttons on the left hand side of the product.

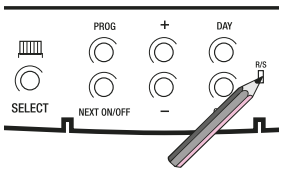
2. Press the RESET button and hold for 3 seconds.

3. Release the RESET button. The display will change to show the current time

4. Finally, release both the +1HR and MAN buttons.

The unit is now fully reset and must be re-programmed, see pages 47-49.





Example

Fault Check List

No Hot Water

Check TS715 programmer. Make sure selector is set to ON.

- Is the red light on?
  - No — Check fuse in fused spur
  - Yes — Check cylinder thermostat
- Is the stat set to a temperature of 60°C?
  - No — Turn knob to 60°C
  - Yes — Check boiler
- Is the boiler on?
  - No — Check the boiler thermostat
  - Yes — Water should be hot in 45 mins.
- Set boiler stat to maximum — Is boiler on?
  - No — Check the reset button
  - Yes — Water should be hot in 45 mins.
- Push the boiler reset button in — Did boiler light?
  - No
  - Yes — Water should be hot in 20 mins.

Telephone your local Heating Engineer

After the water has been heated, return the programmer and other controls to the required settings.

No Heating

Check TS715 programmer. Make sure selector is set to ON.

- Is the red light on?
  - No — Check fuse in fused spur
  - Yes — Check room thermostat
- Is stat. temp. set higher than room temp?
  - No — Set stat to 30°C
  - Yes — Check boiler
- Is the boiler on?
  - No — Check boiler thermostat is set to max.
  - Yes — Radiators should be hot in 45 mins.
- Set boiler stat to maximum Is boiler on?
  - No — Check the reset button
  - Yes — Radiators should be hot in 45 mins.
- Push the boiler reset button in — Did boiler light?
  - No
  - Yes — Radiators should be hot in 20 mins.

Telephone your local Heating Engineer

After the heating has come back on, return the programmer and other controls to the required settings.

Programmable room stat

Installation & User Instructions

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Please Note:
This product should only be installed by a qualified electrician or competent heating installer and should be in accordance with the current edition of the IEEE wiring regulations.

Product specification

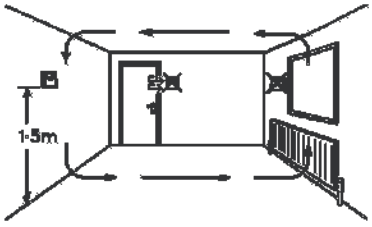
Thermostat features	TP5000 Si	TP5000-RF Si	TP5000M Si	TP5000M 24 Si
Power supply	2 x AA/MN1500/LR alkaline cells		230V, ±15%, 50Hz	24V, ±15%, 50Hz
Memory back-up	Retained for life of product			
Temperature Range Sensing	5-30℃			
Factory set calendar clock	Automatic summer/winter time change			
Switching action of output relay	3(1)A, 10-230V	N/A	3(1)A, 10-230V, Type 1B	
Transmission frequency (RF models)	N/A	433.92MHz	N/A	N/A
Transmission range (RF models)	N/A	30m max.	N/A	N/A
Remote sensor inputs (A models only)	Can be set by installer for remote temperature sensor, limit sensor, window contact or telephone activated switch contacts			
Dimensions (mm)	110 wide, 88 high, 28 deep			
Design standard	EN60730-2-9 (EN300220 for RF)			
Rated impulse voltage	2.5kV			
Ball hardness test	75℃			
Control pollution situation	Degree 2			
Temperature accuracy	±1°C			
Time accuracy	±1 minute per month			

Important note RF products: Ensure that there are no large metal objects, such as boiler cases or other large appliances, in line of sight between the transmitter and receiver as these will prevent communication between thermostat and receiver.

Programmable room stat

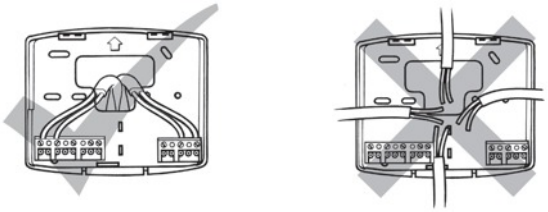
Installation

- First, remove the wallplate from the back of the unit.
- From the top left hand corner of the wallplate, there must be clearances of at least 15mm to the right, 15mm to the left, 30mm above and 100mm below in order to mount the plug-in module.
- Thermostat and Remote Room Sensor: Fix at a height of approximately 1.5m from the floor, away from draughts or heat sources such as radiators, open fires or direct sunlight.
- Prior to mounting the unit the 2 DIL switches on the rear of the unit have to be moved to the required position. The factory presets are shown opposite



Sw. No.	OFF		ON
1	Keyboard disabled		Keyboard enabled
2	Reset disabled		Reset enabled

Cable Access



Battery Installation

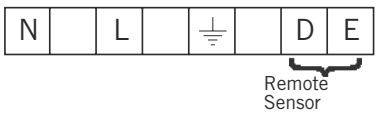
When installing the batteries in the TP5000 Si and TP5000 Si RF please ensure that the correct polarity is observed as per the markings on the inside of the battery compartment.

IMPORTANT: After installing the batteries press and release the RESET button to start the unit. The display may appear blank until this is done. Once the button is released the display will appear. All date, time, programming and override settings are maintained for the life of the product.

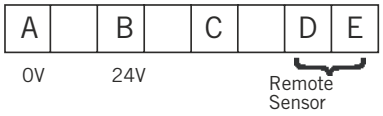
Wiring

Power Supply Connections

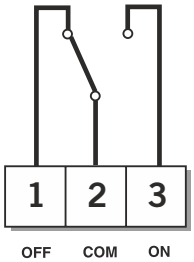
M 230V Models



M 24V



Output Connections, all hard wired models



Programmable room stat

Please Note:
Some existing thermostats will have a Neutral and/or Earth wire connected. These are not required by the battery powered versions of the TP5000 Si and must NOT be connected to any battery powered TP5000 Si terminals. Instead they should be made electrically safe and coiled in the recess at the back of the TP5000 Si.

Models with remote sensor inputs

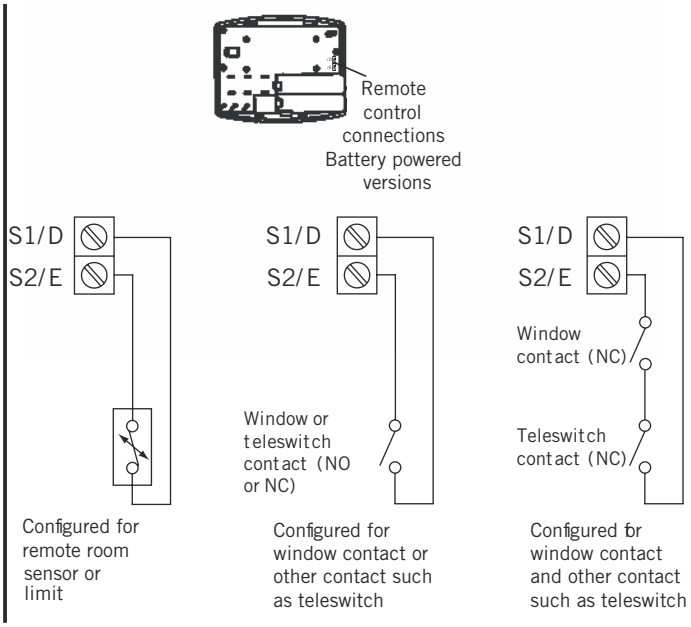
The TP5000A Si, TP5000A-RF Si and TP5000MA Si incorporate an input which can be used to connect one of the following:

1) remote room temperature sensor (sold as accessory).
2) limit sensor, for example, floor temperature sensor (sold as accessory).
3) window contacts, card reader contacts or teleswitch contacts.

See Installer Advanced Programming Options for set-up instructions.

Terminal block for remote control/ sensing is located on the circuit board above the battery compartment.

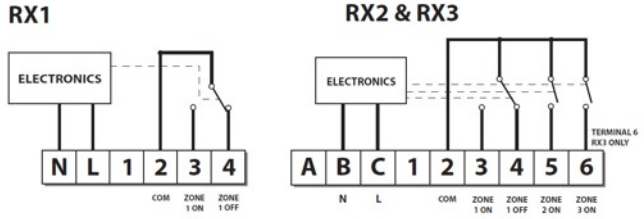
Note:
Battery powered versions use S1 and S2.
Mains powered versions use D and E.


Remote control connections Battery powered versions
S1/D
S2/E
Configured for remote room sensor or limit
S1/D
S2/E
Window or teleswitch contact (NO or NC)
Configured for window contact or other contact such as teleswitch
S1/D
S2/E
Window contact (NC)
Teleswitch contact (NC)
Configured for window contact and other contact such as teleswitch

RX Receiver Wiring (RF models only)

1) For mains voltage operated systems link terminal 2 to mains live supply.

2) Power supply to unit must not be switched by timeswitch.


RX1
ELECTRONICS
N L 1 2 3 4
COM ZONE 1 ON ZONE 1 OFF
RX2 & RX3
ELECTRONICS
A B C 1 2 3 4 5 6
N L
COM ZONE 1 ON ZONE 1 OFF ZONE 2 ON ZONE 3 ON
TERMINAL 6 RX3 ONLY

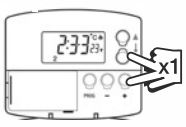
IMPORTANT
To ensure that the factory programmes are set and the microcomputer is operating correctly it is essential that you press and hold the RESET button before you begin any commissioning or programming.

Commissioning (RF models only)

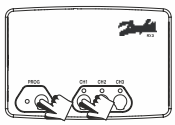
If the thermostat and the receiver have been supplied together in a combined pack, the units have been paired in the factory and no commissioning is required (RX1 only). To make the RX receiver learn the thermostat's signal, follow steps 1-5.

Step 1: TP5000-RF Si - Reset the unit by pressing the recessed reset button.

Step 2: Press and hold ▼ and + buttons for 3 seconds (TP5000 RF Si now transmits unique signal continuously for 3 minutes).



Step 3: RX1 - Press and hold buttons PROG and CH1 for 3 seconds until green light flashes once.



Step 4
RX2 (if applicable)
Stat 1 - perform steps 1-3 and 5.
Stat 2 -perform steps 1-2 and then press **PROG and CH2 on RX2.**
RX3 (if applicable)
Stat 1 - perform steps 1-3 and 5.
Stat 2 - perform steps 1-2 and then press **PROG and CH2 on RX3 then step 5.**
Stat 3 - perform steps 1-2 and then press **PROG and CH3 on RX3.**

Step 5: TP5000Si-RF - Press ▲ or ▼ to select temperature - the unit will revert back to operating mode.

Installer advanced programming options

TP5000 Si incorporates a number of advanced features which can be set by the user. These are accessed via a User Advanced Programming Mode, please refer to User Advanced Programming in the user instructions for details (see page 67).

Installer advanced programming options

TP5000 Si incorporates an additional number of advanced features which can be set by the installer to improve the operating efficiency of the system and where required, to change the user functionality of the product. These are accessed via an Installer Advanced Programming Mode.

These settings are optional and need only be made if there is a demand for the enhanced functions.

Entering Installer Advanced Programming Mode

To access the Installer Advanced Programming Mode follow the steps below:

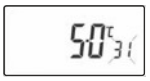
a) Press and hold ▼ and PROG for 3 seconds to enter User Advanced Programming, the display will change to figure opposite.

b) Press and hold ▲ , ▼ and PROG for 5 seconds to enter Installer Advanced Programming, the display will change to figure opposite.

c) Use + and - keys to scroll backwards and forwards between options then ▲ and ▼ keys to change the option settings. The flashing digit on the right hand of the display indicates the number of the selected option. The large characters display the option value selected.

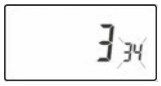
d) To return to RUN, press

Option 30 - Set upper limit of temperature range	
This allows the upper limit of the thermostat setting range to be electronically limited. Press + until Option 30 is displayed, use ▲ & ▼ to select required setting.	
Setting	40 - 5°C (Factory setting is 30°C)

Option 31 - Set lower limit of temperature range	
This allows the lower limit of the thermostat setting range to be electronically limited. Press + until Option 31 is displayed, use ▲ & ▼ to select required setting.	
Setting	5 - 40°C (Factory setting is 5°C)

Option 32 - Enable Off at lower limit	
This enables an OFF function to be selected if a set point below the lower limit is selected. Press + until Option 32 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Disabled
Setting 1	Enabled (factory setting)

Option 33 - Enable On at upper limit	
This enables an ON function to be selected if a set point above the upper limit is selected. Press + until Option 33 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Disabled (factory setting)
Setting 1	Enabled

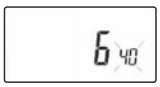
Option 34 - Select On/Off Chrono-proportional	
This allows the thermostat to be set to run in On/Off mode or for a chrono-proportional cycle rate to be selected. Press + until Option 34 is displayed, use ▲ & ▼ to select required setting.	
0	On/Off
3	3 cycles per hour
6	6 cycles per hour (factory setting)
9	9 cycles per hour
12	12 cycles per hour

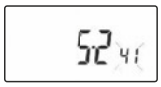
Option 35 - Set integration time (Option 34 set to 3, 6, 9 or 12) (seek advice prior to adjusting)	
This adjusts the integration time of the PI algorithm to increase control accuracy. It is only active if option 34 has been set to Chrono 3, 6, 9 or 12. It should only be adjusted after seeking advice from the manufacturer. Press + until Option 35 is displayed, use ▲ & ▼ to select required setting.	
2.5	Integration time set to 2.5% (factory setting)
5	Integration time set to 5%
10	Integration time set to 10%

Option 36 - Set temperature override rule	
This establishes the degree of temperature override available to the user. Press+ until Option 36 is displayed, use ▲ & ▼ to select required setting,	
Setting 0	No limit (factory setting)
Setting 1	Limited to ±2°C
Setting 2	No override allowed

Option 37 - Set time duration of override rule (Option 36 set to 1 or 2)	
This establishes the duration of a temperature override available to the user. Press + until Option 37 is displayed, Use ▲ & ▼ to select required setting.	
Setting 0	Next event (factory setting)
Setting 1	1 hour
Setting 2	2 hours
Setting 3	3 hours
Setting 4	4 hours

Option 38 - Relay state on low battery detect (battery products only)	
This establishes the position that the relay is driven to when the unit shuts down due to low battery state. Press + until Option 38 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Relay parked with output OFF (factory setting)
Setting 1	Relay parked with output ON

Option 40 - Number of Events per Day	
This sets the thermostat to operate with either 2, 4 or 6 switching events per day or to run it in stat mode. Press + until option 40 is displayed, use ▲ & ▼ to select required setting.	
1	Stat mode
2	Two switching events per day
4	Four switching events per day (Factory setting)
6	Six switching events per day
Setting 4	4 hours

Option 41 - Operating Mode (5/2 day or 24 hour)	
This sets the thermostat to operate using either 5/2 day or 24 hour mode. Press + until option 41 is displayed, use ▲ & ▼ to select required setting.	
5-2	5/2 day (Factory setting)
24	24 hour

Option 70 - Keyboard disable rules	
This establishes the degree of functionality of the keyboard available to the user. It is only active if DIL switch 1 is set to "Disabled". Press + until Option 70 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Normal lock: Programming functions locked (factory setting)
Setting 1	Full lock: All keys are disabled

Option 71 - Random start rules (24V/230 Volt models only)	
This enables a random start on power-up following a power cut to reduce load on the electrical network. Random delay is in the range of 2-90 seconds. Press + until Option 71 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Disabled (factory setting)
Setting 1	Enabled

Option 72 - Owner site reference number	
This enables multi-site owners to store a site reference number in the thermostat. Press + until Option 72 is displayed, use ▲ & ▼ to select required setting.	
Setting	Any value between 00 and 99 can be set
Factory setting is 00	

Option 73 - Owner thermostat reference number	
This enables site owners to store a thermostat reference number in the thermostat. Press + until Option 73 is displayed, use ▲ & ▼ to select required setting.	
Setting	Any value between 000 and 999 can be set
Factory setting is 000	

Option 74 - Date format for calendar clock	
This allows date format to be chosen. Press + until Option 74 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	European format (dd/mm/yy), (Factory setting)
Setting 1	North American format (mm/dd/yy)

Option 81 - Thermostat calibration bias	
This allows the thermostat calibration to be biased by up to ±1.5°C. Press + until Option 81 is displayed, use ▲ & ▼ to select required setting.	
Setting	Any value between ±1.5 in 0.5°C steps (Factory setting is 0°C)

Option 90 - Define remote sensor type, "A" models only	
This allows type of remote sensor input type to be defined. Press + until Option 90 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	No remote sensor fitted (Factory setting)
Setting 1	Remote room or duct sensor fitted, internal sensor disabled,
Setting 2	Remote limit sensor fitted, refer to option 93 to define set-point
Setting 3	Configured as digital input for window, card reader or teleswitch, refer to option 94 to define o/c or s/c.
Setting 4	4 hours

Option 93 - Set limit sensor set-point, "A" models only, (option 90 set to 2)	
This allows the thermostat limit sensor to be set, typical application is floor heating. Press + until Option 93 is displayed, use ▲ & ▼ to select required setting. If the temperature sensed by the limit sensor exceeds the limit setting the output will be turned off until the temperature has dropped by 2°C. "F10" will flash in the display while the output is disabled.	
Setting	Any value between 20 - 50°C (Factory setting is 27°C)

Option 94 - Configure digital input switch type, "A" models only, (option 90 set to 3)	
This allows switch type of digital input to be configured. Press + until Option 94 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Contacts NC, open circuit contact to force unit into thermostat mode, short circuit contacts to return to normal operation
Setting 1	Contacts NO, short circuit contacts to force unit into thermostat mode, open circuit contacts to return to normal operation (Factory setting)

Programmable room stat

What is a programmable room thermostat?

... an explanation for householders

A programmable room thermostat is both a programmer and a room thermostat. A programmer allows you to set 'On' and 'Off' time periods to suit your own lifestyle. A room thermostat works by sensing the air temperature, switching on the heating when the air temperature falls below the thermostat setting, and switching it off once this set temperature has been reached.

So, a programmable room thermostat lets you choose what times you want the heating to be on, and what temperature it should reach while it is on. It will allow you to select different temperatures in your home at different times of the day (and days of the week) to meet your particular needs.

Turning a programmable room thermostat to a higher setting will not make the room eat up any faster. How quickly the room heats up depends on the design of the heating system, for example, the size of boiler and radiators.

Neither does the setting affect how quickly the room cools down. Turning a programmable room thermostat to a lower setting will result in the room being controlled at a lower temperature, and saves energy.

The way to set and use your programmable room thermostat is to find the lowest temperature settings that you are comfortable with at the different times you have chosen, and then leave it alone to do its job.

The best way to do this is to set low temperatures first, say 18°C, and then turn them up by one degree each day until you are comfortable with the temperatures. You won't have to adjust the thermostat further. Any adjustments above these settings will waste energy and cost you more money.
If your heating system is a boiler with radiators, there will usually be only one programmable room thermostat to control the whole house. But you can have different temperatures in individual rooms by installing thermostatic radiator valves (TRVs) on individual radiators.

If you don't have TRVs, you should choose a temperature that is reasonable for the whole house. If you do have TRVs, you can choose a slightly higher setting to make sure that even the coldest room is comfortable, then prevent any overheating in other rooms by adjusting the TRVs. The time on the programmer must be correct. Some types have to be adjusted in spring and autumn at the changes between Greenwich Mean Time and British Summer Time.

You may be able to temporarily adjust the heating programme, for example, 'Override', 'Advance' or 'Boost'. These are explained in the manufacturer's instructions. Programmable room thermostats need a free flow of air to sense the temperature, so they must not be covered by curtains or blocked by furniture. Nearby electric fires, televisions, wall or table lamps may prevent the thermostat from working properly.

An introduction to your programmable room thermostat?

Your programmable room thermostat allows you to programme different temperatures at different time periods. You can programme one set of times and temperatures for week days with a different set of temperatures for weekend days, this is referred to as 5/2 day operation.

The thermostat can also be set up by your installer to provide one set of times and temperatures that are repeated each day of the week. This is referred to as 24 hour operation. The thermostat can also be set by you to provide two different programming blocks which can then be assigned to any day of the week, this is referred to as A/B programme operation.

All thermostats can be set by your installer to provide up 2, 4 or 6 time and temperature settings each day. All thermostats feature useful overrides, including a programmable frost setting.

Your thermostat has some advanced features which the installer will set-up if they are required. There are also a number of advanced features which can be set up by you.

These advanced settings alter the way that your thermostat operates, some also affect the programming functions and the user overrides. Please read the User Advanced Programming instructions before programming the unit (see page 67).

Preset programmes

Your TP5000 Si comes ready programmed with a set of operating times and temperatures which suit most people. Please remember that some of the options available will depend on how the installer has set up the unit.

Programmable room stat

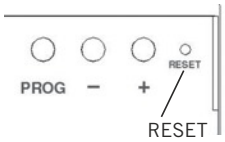
Weekdays (Mon-Fri)		
Event	Time	Temp. °C
1	06:30	20
2	08:30	15
3	11:30	20
4	13:30	15
5	16:30	21
6	22:30	18
Note: these are also times for Block "A" programmes		

Weekend (Sat-Sun)		
Event	Time	Temp. °C
1	07:30	20
2	09:30	20
3	11:30	20
4	13:30	20
5	16:30	21
6	22:30	18
Note: these are also times for Block "B" programmes		

Note: If set up for 4 events per day, events 3 & 4 are skipped. If set up for 2 events per day, events 2, 3, 4 & 5 are skipped. In both cases the events are re-numbered.

Before you start

Open the flap on the front of the programmer and press the RESET button with a non-metallic object until the display goes blank. This will ensure that the micro-computer in the product is operating correctly.



Customising the display

For the sake of clarity, the instructions assume that the display setting uses a 24 hour clock, ℃ and that days of the week are shown as text.

All of these settings can be personalised after the thermostat has been programmed, see pages 65-66

Setting the correct date and time

Your TP5000 Si incorporates a real time clock with calendar function that automatically changes time in both Spring and Autumn. The time and date is set in the factory for the UK time zone, and does not normally require adjustment.

If you live in another time zone refer to "Time zone off set" on page 67. However, should it be found necessary to adjust time or date for any other reason refer to the following instructions.

Setting the date

Press and hold ▲ and PROG for 3 seconds, to display date in dd/mm/yy format.

The YEAR number will flash, use ▲ or ▼ to correct the year.

Use - or + to move to MONTH, then use ▲ or ▼ to correct month.

Use - or + to move to DATE in month, then use ▲ or ▼ to correct day in month.

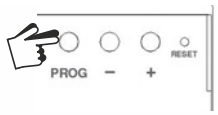
If you attempt to select an invalid date the unit software will reject it and apply the nearest valid date. It is recommended that date is set in the order, yy/mm/dd.

Programmable room stat

Setting the correct time

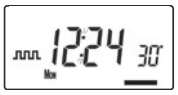
After setting the date press PROG to display the time. The time display will flash on and off.

Use the + and - buttons to set the correct time (press and hold to change in 10 min. increments).



Setting the correct day

The day of the week is set automatically. Press PROG to return to normal operation (RUN).



Accepting the preset programmes

If you are happy with the preset times shown in the table on page 62 you need take no further action.

Changing the preset programmes

Before you change the preset programmes Your installer will have set the unit to operate in one of the following modes:

- 5/2 day - one set of programmes for weekdays and another for weekends as per section below
- 24 hr - one set of programmes for the whole of the week (page 64).

Alternatively

- A/B - The unit can also be set by you to provide two programme blocks, either of which can be applied to different days of the week.

If this is required refer to page 64 for instructions on how to turn on this feature.

Please Note

The unit must be programmed in sequence, event times cannot be set out of sequence.
If you want to leave a preset time as it is, simply press PROG to move to the next setting.
If you want to return the unit to RUN, press PROG and hold until the display returns to the previous RUN mode.
Alternatively leave alone and the unit will automatically return to RUN after 2 minutes.
Your installer will have set your unit to programme 6, 4 or 2 events per day. This will determine the number of events per day that you are able to programme.

Changing the preset programmes in 5/2 day mode

For Weekdays

a) Press PROG until the first preset time and temperature (Event 1 Days MON, TUE, WED, THU, FRI) appears in display.

b) Use the + and - buttons to adjust the TIME (press and hold to change in 10 minute increments).

c) Use the ▲ & ▼ buttons to adjust the required TEMPERATURE.

d) Press PROG to move to the next preset time and temperature (Event 2).

e) Repeat steps b, c, & d to programme the remaining weekday events.

Programmable room stat

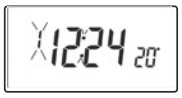
Changing the preset programmes in 5/2 day mode

For Weekends
Press PROG until the first preset time and temperature (Event 1 Days SAT, SUN) appears in display.

Repeat steps b, c, & d above to programme the remaining weekend events.

Changing the preset programmes in 24 hour mode

a) Press PROG until the first preset time and temperature (Event 1 for all days of the week) appears in display.



b) Use the + and - buttons to adjust the TIME (press and hold to change in 10 min increments).

c) Use the ▲ & ▼ buttons to adjust the required TEMPERATURE.

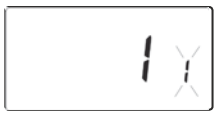
d) Press PROG to move to the next preset time and temperature (Event 2).

e) Repeat steps b, c, & d to programme the remaining events.

Changing preset programmes for AB programming (Installer setting must be in 5/2 day mode)

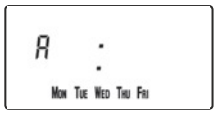
(Installer setting must be in 5/2 day mode)
Press and hold PROG and V for 3 seconds. The display will change to the figure opposite. This will take you into User Advanced Programming option 1.

Use ▲ & ▼ keys to enable or disable the function (1=enabled, 0=disabled).



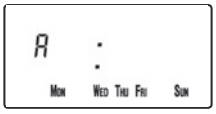
Press PROG for 5 seconds until the display returns to previous RUN mode.

Press PROG once, the display will change to show the default days assigned to programme "A" (days MON, TUE, WED, THU, FRI).



Use the + and - keys to scroll forwards or backwards through the days of the week.

To deselect a day press V, (for example TUE). To select a day press (for example SUN).



Any deselected days are automatically assigned to programme "B".

Programmable room stat

Setting the correct time

a) Press PROG until the first preset time and temperature (Event 1 for Programme A) appears in display.

b) Use the + and - buttons to adjust the TIME (press and hold to change in 10 minute increments).

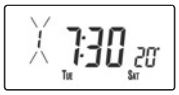
c) Use the ▲ & ▼ buttons to adjust the required TEMPERATURE.

d) Press PROG to move to the next preset time and temperature (Event 2).

e) Repeat steps b, c, & d to programme the remaining events

Programming "B" programme days and events

a) Press PROG until the first preset time and temperature (Event 1 for Programme B) appears in the display.



b) Use the + and - buttons to adjust the TIME (press and hold to change in 10 minute increments).

c) Use the ▲ & ▼ buttons to adjust the required TEMPERATURE.

d) Press PROG to move to the next preset time and temperature (Event 2).

e) Repeat steps b, c, & d to programme the remaining events.

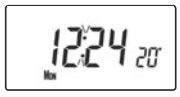
Running the programme

Press PROG to return to previous RUN mode. The heating will now follow the times and temperatures programmed.

User Overrides

Altering the display to show time or temperature

Press + and - together to change between settings.



Temporarily alter current programmed temperature

Press ▲ & ▼ until required temperature is displayed. Please note that your installer may have restricted both upper and lower temperature settings and the temperature override limits. This override will automatically be cancelled at the beginning of the next programmed event.

Please note that your installer may have restricted the duration of the override to something other than next event.
In this case the override arrow will flash to indicate a timed override is active during the next event

To change day of week legends from numbers to text

Press ▲ and - together to toggle between day numbers and text.

Programmable room stat

To change time display between 12 hour and 24

Press ▲ and + together to toggle between 12 and 24 hour

To change between °C and °F scaling

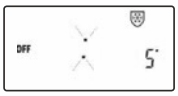
Press ▼ and - together to toggle between °C and ° F temperature scaling.

Thermostat mode

a) A constant temperature of between 5-30℃ can be selected if required. This can provide frost protection for periods away from home, it can also be used to provide untimed higher temperatures if, for example, a family member is sick.

b) Press ▲ & ▼ together to enter thermostat mode. The default setting is 5℃, but this can be reprogrammed, see User Advanced Programming, step 10, (page 67).

c) A frost protection symbol (snowflake in a shield) will appear in the display when the selected temperature is equal to or less than the programmed frost protection setting.



d) Use the ▲ & ▼ buttons to change the temperature away from the programmed frost protection temperature to another value.

e) To return to automatic programming press both ▲ & ▼ together

Changing the clock forwards and backwards

This is handled automatically, however, if the manual changeover has been selected (User Advanced Programming step 3 on page 67) follow the instructions below.

To change from Summer to Winter (clocks back) With clock display showing, press and hold - button until time moves back.

To change from Winter to summer (clocks forward) With clock display showing, press and hold + button until time moves forward.

Remote override into and out of thermostat mode

Selected models are available with a feature which allows a telephone activated switch or window contacts to step the unit into or out of thermostat mode.

The required temperature to be maintained when the building is unoccupied, or when windows are open, must first be set up in User Advanced Programming, step 10, (page 67). To locally override this feature press both ▲ & ▼ together.

Delay start feature

Your thermostat includes an optional delay start feature to hold off the heating for a time on mild days when the room temperature at the start of an event is close to the programmed value. If you have enabled this function it can be overridden by pressing either ▲ or ▼ buttons.

To enable this feature, please refer to User Advanced Programming, step 11, (page 68).

When this function is active, the set temperature will flash on the display and an hourglass symbol will be displayed.

Programmable room stat

Optimum start control (OSC)

Your thermostat includes an optional optimum start control. This feature allows you to set the time at which you require a room temperature by.

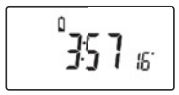
The thermostat then calculates how soon before the event time the system must be turned up to ensure that the room is at the temperature by the required time.

A full description of this and how to enable it and set it up is given in User Advanced Programming, steps 12 & 13, (page 68).

When this function is active, the set temperature will flash on the display

Battery replacement (battery models only)

When batteries are low a battery symbol will appear on the display. You have 15 days to replace the batteries before the unit shuts down. When replacing batteries ensure that



IMPORTANT: After replacing the batteries press and release the RESET button to restart the unit. All date, time, programming and override settings are maintained for the life of the product.

User Advanced Programming Options

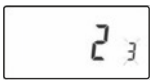
Important: The thermostat has been set in the factory to suit most situations, however, there are additional optional settings which can improve the comfort, convenience and energy effectiveness of your thermostat. These are set in the User Advanced Programming and Installer Advanced Programming modes.

To access User Advanced Programming

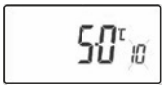
Press and hold ▼ and PROG for 3 seconds. This will take you into User Advanced Programming. Use + and - keys to scroll backwards and forwards between options then ▲ & ▼ keys to change option settings.

The flashing digit on the right hand of the display indicates the number of the selected option.

Option 1 - Enable or disable A/B programming (option 41 set to 5+2)	
This enables or disables the A/B programming option. Press + until Option 1 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Disabled, unit operates as 5+2 or 24 hour product depending on installer settings (factory setting)
Setting 1	Enabled: activates A/B programming

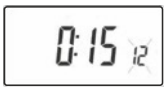
Option 3 - Calendar clock rules	
This establishes the rules that the automatic calendar clock follows to calculate changes between summer and winter time. Press + until Option 3 is displayed, use ▲ & ▼ to select required setting	
Setting 0	Disabled.
Setting 1	Manual: user must change using + to advance and -retard displayed time.
Setting 2	European rules. (Factory Setting)
Setting 3	USA rules (2007 onwards)
Setting 4	USA rules (pre-2007)

Option 4 - Time zone offset	
This feature allows the time zone to be established and corrects time display. Press + until Option 4 is displayed, use ▲ & ▼ to select required setting	
Setting 0	UK models: this feature should be left at the factory setting of 0.
Setting 1	Central European time models: this feature should be left at the factory setting of +1:00.
-12 Hours +14 Hours. Rest of World: use ▲ & ▼ keys to select offset from Universal time (GMT) for the location in which the thermostat is being installed.	

Option 10 - Frost/ thermostat mode setting	
This feature allows the default frost/ thermostat mode temperature to be set. Press + until Option 10 is displayed, use ▲ & ▼ to select required setting.	
5-40°C - Factory setting is 5°C, but can be changed to any value between 5-40°C.	

Option 11 - Start-up method	
Your thermostat can start up the system in three different ways. Press + until Option 11 is displayed, use ▲ & ▼ to select required setting.	
Setting 0	Normal: Heating is turned up or down at the programmed times.
Setting 1	Optimum start control (OSC) (or Comfort Setting): This allows you to programme the time at which you would like to be up to the required temperature. The thermostat then calculates how soon before the required time the heating is turned up. This will vary with weather conditions ranging from a maximum of 120 minutes to 0 minutes before the programmed event time. This setting must be used together with option 12 to match the optimiser setting to the building in which it is installed.
Setting 2	Delay start (or Economy Setting): This is an alternative to OSC. Set the event times in the normal way taking into account the time that the building takes to heat on an average day. The thermostat monitors switch on time, actual temperature and wanted temperature and delays the start of the heating if the actual temperature is close to the programmed temperature.

Option 13 - Optimum start control/Delayed start event setting (Option 11 set to 1 or 2)	
The Optimum start or delayed start control can be applied to event 1 only or to each event of the day which requires a higher temperature than the previous event. Press + until Option 13 is displayed, use ▲ & ▼ to select required setting (only active if Option 11 is set to 1 or 2).	
Setting 0	Applies only to first event of day. (Factory setting)
Setting 1	Applies to each event of the day that requires a higher temperature compared to previous event.

Option 12 - Optimum start control pre-heat setting (Option 11 set to 1)	
Press + until Option 12 is displayed, use ▲ & ▼ to select required setting (only active if Option 11 is set to 1).	
The optimum start control must be adjusted to match the building energy characteristics. Use the ▲ & ▼ keys to selected the required pre-heat period. The table below suggests typical settings. If the building fails to reach temperature on time, increase the setting by 15 minute steps each day until the correct setting is found. If the building reaches temperature ahead of time, decrease the setting by 15 minute steps each day until the correct setting is found.	
00:15	15mins, warm air systems, well insulated building.
00:30	30mins, warm air systems, well insulated building.
00:45	45mins, warm air system poorly insulated building.
01:00	60 mins, radiator system, light weight well insulated building. (Factory setting)
01:15	75 mins, radiator system, light weight medium insulation.
01:30	90 mins, radiator system, medium weight poorly insulation.
01:45	105 mins, radiator system, heavy weight building, well insulated.
02:00	120 mins, radiator system, heavy weight building, poorly insulated.

Programmable room stat

Temperature range limitation

This allows the installer to programme both upper and lower temperature limits. It may limit the upper and lower temperature that you are able to set on the thermostat.

Temperature override limitation

This allows the installer to limit the number of degrees that you can override the programmed temperature by, it also allows the installer to set rules regarding how long a temperature override will remain in place.

Keyboard lock

This allows the installer to limit or lock the keyboard to prevent unauthorised changes to programme values and limits overrides.

What happens to the unit when batteries fail

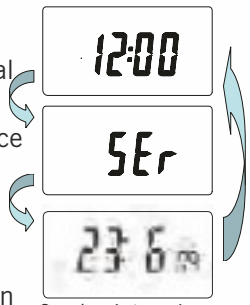
If batteries are not changed within 15 days of a low battery warning, the unit shuts down. In normal circumstances the thermostat turns off the valve or the boiler it is controlling. In extreme climates turning off the heating is likely to result in the building freezing up. To prevent this, the installer can set up the unit to turn the heating ON rather than turn OFF on battery failure. This will consume more fuel but will prevent damage occurring to the building. If appropriate please check that the installer has set this function correctly.

Please note: If you replace the batteries and the LCD does not come on immediately please check battery orientation. Do not leave batteries in the product if the display is not active.

If, after changing the batteries, the screen remains blank it is necessary to carry out a partial reset. See below for details.

Service Interval Timer

- If the property is owned by a landlord he may, for gas safety reasons, have instructed the installer to set the service interval timer.
- If set, 28 days prior to the service due date, a visual and audible warning will start each day at noon. The audible warning will last for 10 seconds and will be repeated every hour until a button is pressed to cancel it. If cancelled the alarm will recommence the following day at noon.



Service Interval

- If the boiler is not serviced before the due date, a visual and audible warning will start each day at noon. The audible warning will last for 1 minute and will be repeated every hour until a button is pressed to cancel it. If cancelled the alarm will recommence the following day at noon.
- In addition, all overrides and programming buttons will be disabled and the heating may operate for a limited amount of time each hour.
- The installer may cancel or reset the service interval timer as part of the boiler service.
- This is a gas safety feature that can only be accessed by an installer.

Resetting the unit

Partial reset: Press RESET (used to restart micro-computer) if display freezes for any reason. This does not reset any programme, clock or date. It is recommended that this is done at time of installation.
User full reset: Press RESET whilst holding down PROG button. This resets event times and any User Advanced Programme setting, but does not reset time or date.

Installer full reset: This is only available to the installer. In addition to the above all of the Installer Advanced Programming settings are returned to factory settings, however, time, date and service due date are not reset.

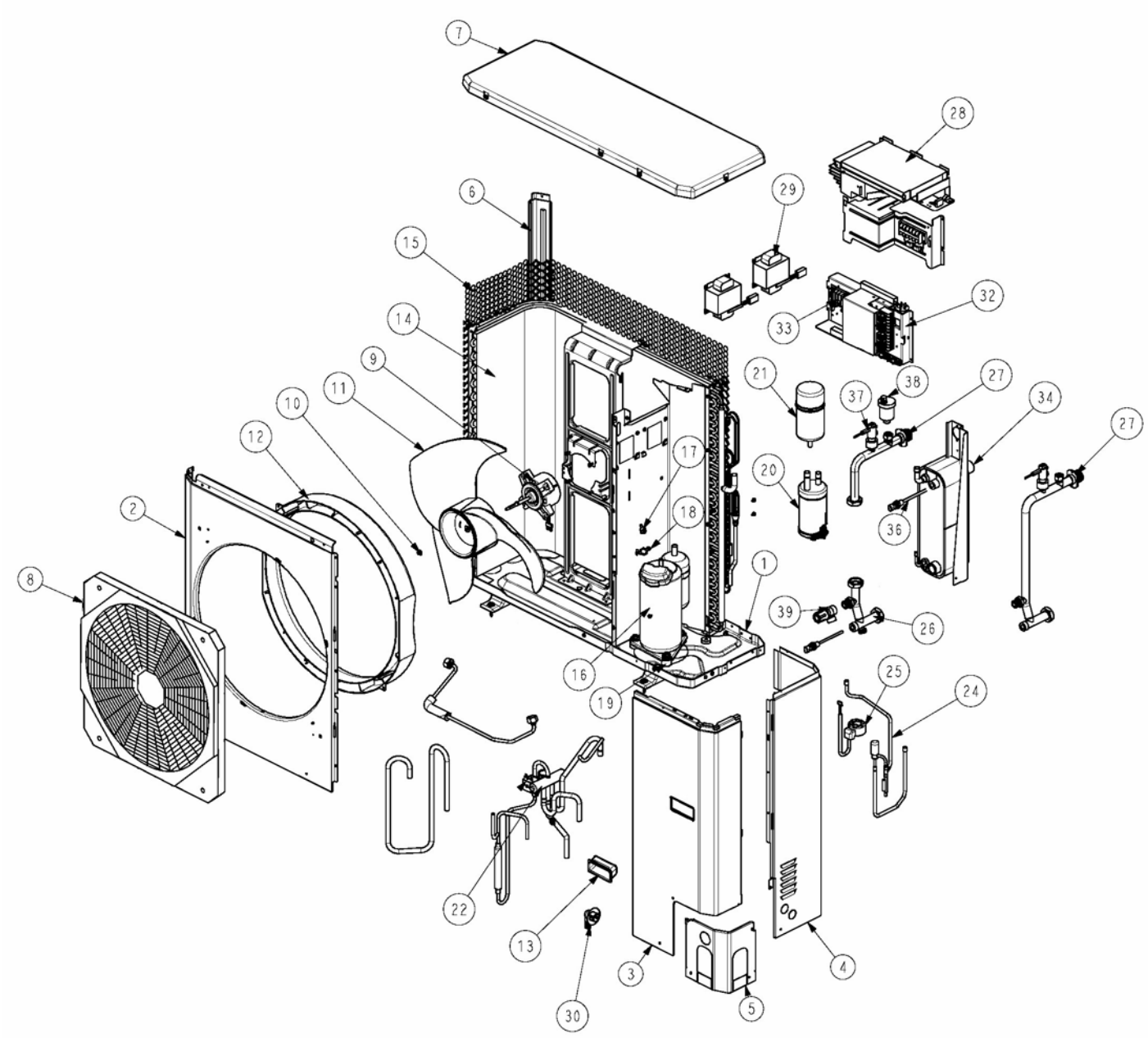
Settings Reference

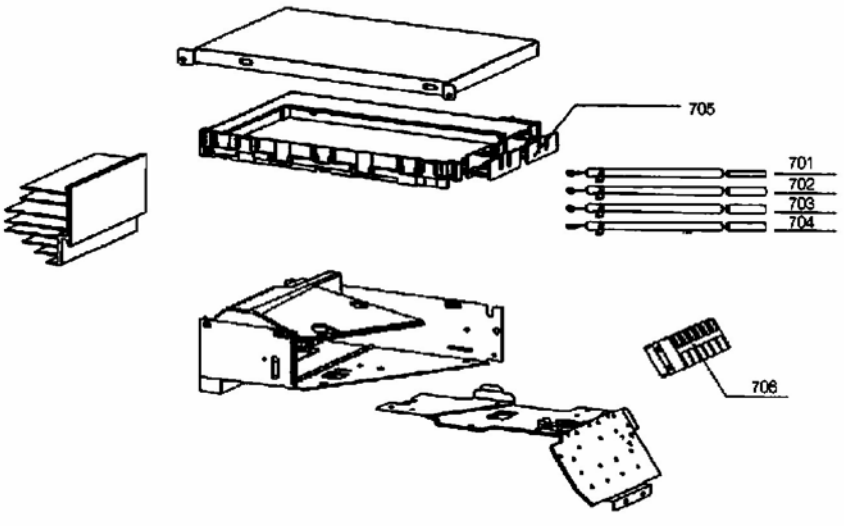
Note to installers:
Please use this table to record changes to default settings.

Installer Settings		
Option	Description	Installer Set Value
30	Set upper limit of temperature range	
31	Set lower limit of temperature range	
32	Enable Off at lower limit	
33	Enable On at upper limit	
34	Select On/Off or Chrono-proportional	
35	Set Integration Time	
36	Set temperature override rule	
37	Set time duration of override rule	
38	Relay state on low battery detect (battery products only)	
40	Number of events per day	
41	Operating mode (5/2 day or 24 hour)	
70	Keyboard disable rules	
71	Random start rules (24V/230V only)	
72	Owner site reference number	
73	Owner thermostat reference number	
74	Date format for calendar clock	
81	Thermostat calibration bias	
90	Define remote sensor type ("A" models only)	
93	Set limit sensor set-point ("A" models only)	
94	Configure digital input switch ("A" models only)	

User Settings		
Option	Description	Installer Set Value
1	Enable or disable A/B programming	
3	Calendar Clock Rules	
4	Time zone off set	
10	Frost/Thermostat mode setting	
11	Start-up method	
12	Optimum start control pre-heat setting	
13	Optimum start control/Delayed start event setting	

KHP0041 - 4kW, KHP0038 - 6kW, KHP0039 - 8kW

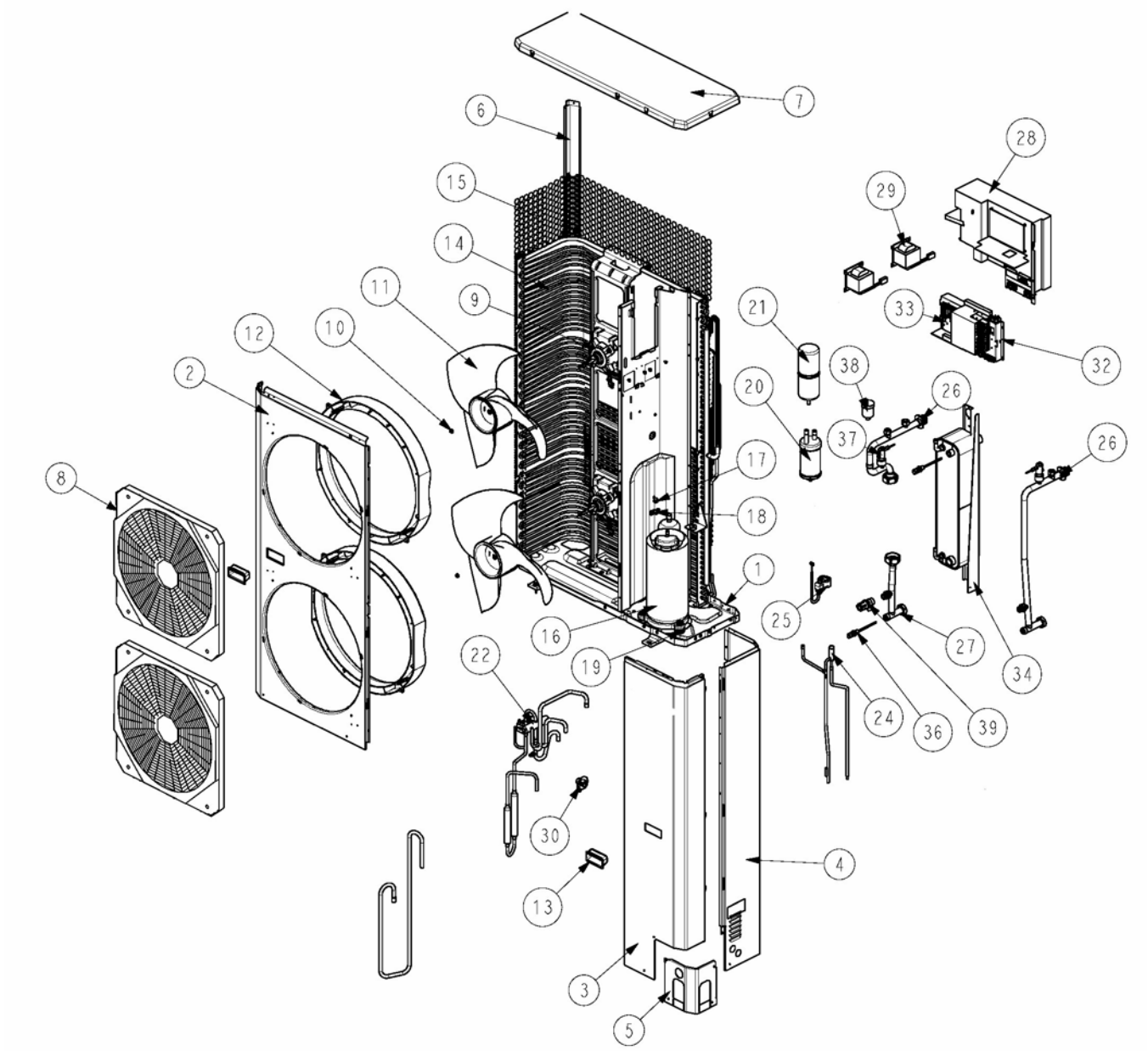


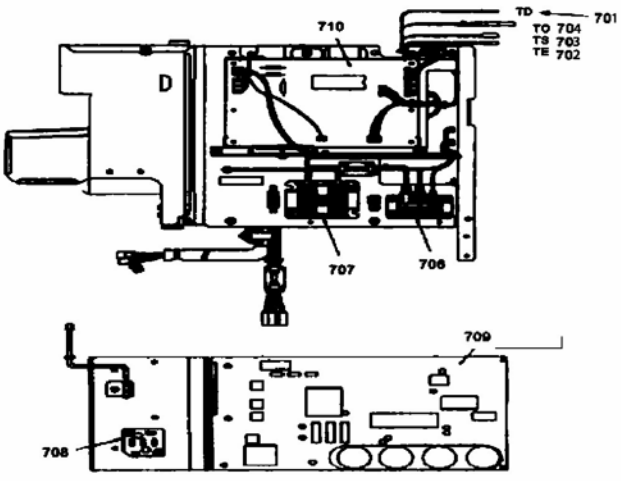


Spare Part List

Pos.	Description	Qty	Note
1	Base pan assy	1	
2	Front panel	1	
3	Ass. front side panel	1	
4	Ass. rear side panel	1	
5	Front service cover	1	
6	Pillar	1	
7	Ass. top cover	1	
8	Fan guard grille	1	
9	Fan motor	1	
10	Motor nut	1	
11	Propeller fan	1	
12	Orifice	1	
13	Handle	1	
14	Condenser coil assy	1	
15	Coil guard net	1	
16	Compressor (DA111A1F-20F1)	1	
17	Klixon	1	
18	Klixon holder	1	
19	Cushion rubber	3	
20	Suction accumulator	1	
21	Liquid receiver	1	
22	/4 way valve	1	
24	PMV liquid assy	1	
25	PMV solenoid coil	1	
26	outlet water pipe	1	
27	Inlet water pipe	1	
28	Ass. control box inverter	1	
29	Reactor (CH-57-Z-T)	2	
30	Drain pipe	1	
31	-	-	
32	Assembly control box GMC	1	
33	GMC board	1	
34	Brazed plate heat exchanger assembly	1	
35	-	-	
36	Water sensor	2	
37	Flow switch	1	
38	Automatic purge valve	1	
39	Water pressure relief valve	1	
701	Sensor (TD)	1	
702	Sensor (TE)	1	
703	Sensor (TS)	1	
704	Sensor (TO)	1	
705	Base. P.C. Board	1	
706	Terminal block 6P, 20A	1	

KHP0040 - 12kW, KHP0042 - 15kW





Spare Part List

Pos.	Description	Qty	Note
1	Base pan assy	1	
2	Front panel	1	
3	Ass. front side panel	1	
4	Ass. rear side panel	1	
5	Front service cover	1	
6	Pillar	1	
7	Ass. top cover	1	
8	Fan guard grille	2	
9	Fan motor	2	
10	Motor nut	2	
11	Propeller fan	2	
12	Orifice	2	
13	Handle	2	
14	Condenser coil assy	1	
15	Coil guard net	1	
16	Compressor (DA420A3F-21M)	1	
17	Klixon	1	
18	Klixon holder	1	
19	Cushion rubber	3	
20	Suction accumulator	1	
21	Liquid receiver	1	
22	4 way valve	1	
24	PMV liquid assy	1	
25	PMV solenoid coil	1	
26	/inlet water pipe	1	
27	/Inlet water pipe	1	
28	Ass. control box inverter	1	
29	Reactor (CH-57-Z-T)	2	
30	Drain pipe	1	
31	-	-	
32	Assembly control box GMC	1	
33	GMC board	1	
34	Brazed plate heat exchanger assembly	1	
35	-	-	
36	/Water sensor	1	
37	Flow switch	1	
38	/Automatic purge valve	1	
39	Water pressure relief valve	1	
701	Sensor (TD)	1	
702	Sensor (TE)	1	
703	Sensor (TS)	1	
704	Sensor (TO)	1	
706	Terminal block 3P, 20A	1	
707	Terminal block 3P, 30A	1	
708	Rectifier	1	
709	PCB	1	
710	PCB	1	

Rating Tables

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20									1.86	1.87	1.87	
	-10	2.33	2.41	2.44	2.46	2.5	2.53	2.56	2.59	2.60	2.61	2.61	
EWT-LWT 30-35	-7	2.53	2.62	2.65	2.67	2.71	2.75	2.78	2.81	2.83	2.84	2.84	
	-5	2.67	2.76	2.79	2.82	2.85	2.89	2.93	2.96	2.97	2.98	2.99	
	-3	2.80	2.90	2.93	2.95	3.00	3.03	3.08	3.11	3.12	3.13	3.13	
	0	3.00	3.10	3.14	3.16	3.21	3.25	3.30	3.33	3.35	3.36	3.36	
	2	3.10	3.21	3.24	3.27	3.32	3.36	3.41	3.44	3.46	3.47	3.47	
	7	3.97	4.03	4.05	4.09	4.14	4.2	4.24	4.27	4.29	4.30	4.30	
	10	4.38	4.45	4.47	4.51	4.57	4.63	4.68	4.71	4.73	4.74	4.74	
	20	5.73	5.83	5.85	5.92	5.99	6.06	6.13	6.17	6.20	6.22	6.22	
	30	7.09	7.21	7.24	7.32	7.40	7.50	7.58	7.63	7.67	7.69	7.69	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20									0.81	0.59	0.37	
	-10	2.67	2.64	2.62	2.49	2.26	1.97	1.67	1.37	1.08	0.78	0.49	
EWT-LWT 30-35	-7	2.87	2.83	2.82	2.67	2.43	2.12	1.80	1.48	1.16	0.84	0.52	
	-5	3.00	2.96	2.95	2.80	2.54	2.21	1.88	1.54	1.21	0.88	0.55	
	-3	3.13	3.09	3.07	2.91	2.65	2.31	1.96	1.61	1.26	0.92	0.57	
	0	3.33	3.28	3.27	3.10	2.82	2.45	2.08	1.71	1.34	0.97	0.61	
	2	3.50	3.45	3.44	3.11	2.97	2.58	2.19	1.80	1.41	1.02	0.64	
	7	4.73	4.61	4.10	3.77	3.39	2.94	2.51	2.05	1.61	1.20	0.77	
	10	5.14	5.01	4.45	4.09	3.68	3.20	2.72	2.23	1.74	1.30	0.83	
	20	6.49	6.33	5.62	5.17	4.65	4.04	3.44	2.81	2.20	1.64	1.05	
	30	7.85	7.65	6.79	6.25	5.62	4.88	4.16	3.40	2.66	1.99	1.27	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20									1.81	1.82	1.82	
	-10	2.07	2.11	2.11	2.13	2.16	2.19	2.21	2.23	2.24	2.25	2.25	
EWT-LWT 40-45	-7	2.19	2.23	2.24	2.26	2.29	2.32	2.34	2.36	2.37	2.37	2.38	
	-5	2.27	2.31	2.32	2.34	2.37	2.4	2.43	2.44	2.46	2.46	2.46	
	-3	2.35	2.39	2.40	2.42	2.45	2.48	2.51	2.53	2.54	2.55	2.55	
	0	2.47	2.51	2.52	2.54	2.58	2.61	2.64	2.66	2.67	2.68	2.68	
	2	2.60	2.63	2.64	2.67	2.74	2.8	2.83	2.85	2.86	2.87	2.87	
	7	3.15	3.19	3.2	3.23	3.27	3.32	3.35	3.38	3.39	3.40	3.40	
	10	3.33	3.38	3.39	3.42	3.47	3.51	3.55	3.57	3.59	3.6	3.6	
	20	3.95	4.00	4.02	4.06	4.11	4.16	4.21	4.24	4.26	4.27	4.27	
	30	4.57	4.63	4.65	4.70	4.75	4.81	4.86	4.9	4.92	4.94	4.94	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20									0.76	0.55	0.34	
	-10	2.56	2.52	2.51	2.38	2.17	1.89	1.6	1.32	1.03	0.75	0.47	
EWT-LWT 40-45	-7	2.76	2.72	2.71	2.57	2.34	2.03	1.73	1.42	1.11	0.81	0.5	
	-5	2.89	2.86	2.84	2.70	2.45	2.13	1.81	1.49	1.17	0.85	0.53	
	-3	3.03	2.99	2.98	2.82	2.57	2.23	1.9	1.56	1.22	0.89	0.55	
	0	3.23	3.19	3.17	3.01	2.74	2.38	2.02	1.66	1.30	0.95	0.59	
	2	3.40	3.36	3.34	3.16	2.92	2.51	2.13	1.75	1.37	1.00	0.62	
	7	4.5	4.39	3.90	3.59	3.22	2.8	2.39	1.95	1.53	1.14	0.73	
	10	4.84	4.72	4.19	3.86	3.47	3.01	2.56	2.10	1.64	1.23	0.78	
	20	5.97	5.82	5.17	4.75	4.27	3.71	3.16	2.58	2.02	1.51	0.97	
	30	7.1	6.91	6.14	5.65	5.08	4.41	3.76	3.07	2.41	1.8	1.15	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20								1.51	1.52	1.52	1.52	
	-10	1.68	1.7	1.71	1.72	1.75	1.77	1.79	1.8	1.81	1.81	1.81	
EWT-LWT 50-55	-7	1.77	1.79	1.8	1.82	1.84	1.86	1.88	1.9	1.91	1.91	1.91	
	-5	1.83	1.85	1.86	1.88	1.91	1.93	1.95	1.96	1.97	1.98	1.98	
	-3	1.89	1.92	1.92	1.94	1.97	1.99	2.02	2.03	2.04	2.04	2.04	
	0	1.98	2.01	2.02	2.04	2.07	2.09	2.11	2.13	2.14	2.14	2.14	
	2	2.11	2.13	2.14	2.16	2.19	2.21	2.24	2.25	2.26	2.27	2.27	
	7	2.43	2.46	2.47	2.50	2.53	2.56	2.59	2.61	2.62	2.63	2.63	
	10	2.56	2.59	2.6	2.63	2.66	2.7	2.73	2.75	2.76	2.77	2.77	
	20	3.00	3.03	3.04	3.08	3.12	3.16	3.19	3.21	3.23	3.23	3.24	
	30	3.47	3.47	3.49	3.52	3.57	3.61	3.65	3.68	3.69	3.7	3.7	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20								0.85	0.67	0.5	0.32	
	-10	2.31	2.27	2.21	2.03	1.83	1.59	1.35	1.11	0.87	0.65	0.41	
EWT-LWT 50-55	-7	2.49	2.44	2.39	2.19	1.97	1.71	1.46	1.19	0.93	0.7	0.45	
	-5	2.66	2.61	2.55	2.35	2.11	1.83	1.56	1.27	1	0.74	0.48	
	-3	2.83	2.77	2.71	2.49	2.24	1.94	1.66	1.35	1.06	0.79	0.51	
	0	3.05	2.99	2.92	2.69	2.42	2.1	1.79	1.46	1.14	0.85	0.55	
	2	3.21	3.15	3.07	2.83	2.54	2.21	1.88	1.54	1.2	0.90	0.58	
	7	4.22	4.11	4.02	3.69	3.32	2.88	2.46	2.01	1.57	1.17	0.75	
	10	4.52	4.41	4.31	3.96	3.56	3.10	2.64	2.16	1.69	1.26	0.81	
	20	5.55	5.41	5.29	4.86	4.37	3.8	3.23	2.64	2.07	1.55	0.99	
	30	6.41	6.41	6.26	5.76	5.18	4.50	3.83	3.13	2.45	1.83	1.17	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20												
	-10	1.74	1.76	1.76	1.78	1.8	1.83	1.85	1.86	1.87	1.87	1.87	
EWT-LWT 50-60	-7	1.83	1.85	1.86	1.88	1.9	1.93	1.95	1.96	1.97	1.98	1.98	
	-5	1.9	1.92	1.93	1.95	1.97	2.00	2.02	2.03	2.04	2.05	2.05	
	-3	1.97	1.99	1.99	2.01	2.04	2.07	2.09	2.1	2.11	2.12	2.12	
	0	2.06	2.08	2.09	2.11	2.13	2.16	2.18	2.2	2.21	2.22	2.22	
	2	2.17	2.19	2.2	2.22	2.25	2.28	2.3	2.32	2.33	2.34	2.34	
	7	2.45	2.47	2.48	2.51	2.54	2.57	2.6	2.62	2.63	2.64	2.64	
	10	2.58	2.6	2.61	2.64	2.67	2.71	2.74	2.76	2.77	2.78	2.78	
	20	3.04	3.04	3.05	3.08	3.12	3.16	3.19	3.21	3.23	3.24	3.24	
	30	3.47	3.47	3.48	3.52	3.56	3.61	3.65	3.67	3.69	3.7	3.7	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
4 kW Unit	-20												
	-10	2.35	2.31	2.26	2.08	1.87	1.62	1.4	1.16	0.91	0.68	0.43	
EWT-LWT 50-60	-7	2.61	2.56	2.5	2.30	2.07	1.79	1.53	1.25	0.98	0.73	0.47	
	-5	2.79	2.73	2.67	2.46	2.2	1.92	1.63	1.33	1.04	0.78	0.5	
	-3	2.96	2.90	2.83	2.61	2.34	2.04	1.73	1.42	1.11	0.83	0.53	
	0	3.20	3.13	3.06	2.81	2.53	2.2	1.87	1.53	1.20	0.89	0.57	
	2	3.37	3.29	3.22	2.96	2.66	2.31	1.97	1.61	1.26	0.94	0.6	
	7	4.36	4.25	4.16	3.82	3.44	2.99	2.54	2.08	1.63	1.22	0.78	
	10	4.64	4.53	4.42	4.07	3.66	3.18	2.71	2.21	1.73	1.29	0.83	
	20	5.44	5.44	5.31	4.89	4.39	3.82	3.25	2.66	2.08	1.55	0.99	
	30	6.26	6.26	6.21	5.71	5.13	4.46	3.8	3.10	2.43	1.81	1.16	
	OAT												

Rating Tables

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20									1.76	1.77	1.77	
	-10	2.21	2.29	2.31	2.33	2.36	2.4	2.43	2.45	2.47	2.47	2.47	
EWT-LWT 30-35	-7	2.4	2.48	2.51	2.53	2.57	2.6	2.64	2.66	2.68	2.69	2.69	
	-5	2.53	2.61	2.64	2.67	2.7	2.74	2.78	2.8	2.82	2.83	2.83	
	-3	2.65	2.74	2.77	2.8	2.84	2.87	2.91	2.94	2.96	2.97	2.97	
	0	2.84	2.94	2.97	3.0	3.04	3.08	3.12	3.15	3.17	3.18	3.18	
	2	2.94	3.04	3.07	3.1	3.14	3.18	3.23	3.26	3.28	3.29	3.29	
	7	3.97	4.14	4.2	4.24	4.29	4.35	4.41	4.45	4.48	4.49	4.49	
	10	4.38	4.57	4.63	4.67	4.73	4.8	4.86	4.91	4.94	4.95	4.96	
	20	5.73	5.98	6.07	6.12	6.2	6.28	6.37	6.43	6.47	6.49	6.49	
	30	7.09	7.4	7.5	7.57	7.67	7.77	7.88	7.95	8.00	8.03	8.03	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20									0.99	0.72	0.45	
	-10	3.26	3.22	3.2	3.04	2.76	2.4	2.04	1.68	1.32	0.95	0.6	
EWT-LWT 30-35	-7	3.5	3.45	3.44	3.26	2.97	2.58	2.19	1.8	1.41	1.02	0.64	
	-5	3.66	3.61	3.6	3.41	3.1	2.7	2.29	1.88	1.48	1.07	0.67	
	-3	3.82	3.77	3.75	3.56	3.24	2.82	2.39	1.97	1.54	1.12	0.7	
	0	4.06	4.01	3.99	3.78	3.44	2.99	2.54	2.09	1.64	1.19	0.74	
	2	4.27	4.22	4.2	3.8	3.62	3.15	2.67	2.20	1.72	1.25	0.78	
	7	6.14	5.9	5.82	5.52	5.02	4.37	3.71	3.05	2.39	1.73	1.08	
	10	6.67	6.4	6.32	5.99	5.45	4.74	4.02	3.31	2.59	1.88	1.18	
	20	8.42	8.09	7.98	7.57	6.88	5.99	5.08	4.18	3.28	2.38	1.49	
	30	10.18	9.77	9.64	9.15	8.32	7.24	6.14	5.05	3.96	2.87	1.79	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20							1.98	2	2.01	2.02	2.02	
	-10	2.03	2.13	2.16	2.18	2.2	2.23	2.26	2.28	2.30	2.31	2.31	
EWT-LWT 40-45	-7	2.11	2.2	2.24	2.26	2.29	2.32	2.35	2.37	2.38	2.39	2.39	
	-5	2.16	2.26	2.29	2.31	2.34	2.37	2.4	2.43	2.44	2.45	2.45	
	-3	2.21	2.31	2.34	2.37	2.40	2.43	2.46	2.48	2.5	2.51	2.51	
	0	2.29	2.39	2.42	2.45	2.48	2.51	2.55	2.57	2.58	2.59	2.59	
	2	2.40	2.51	2.54	2.57	2.6	2.69	2.73	2.75	2.77	2.78	2.78	
	7	2.91	3.00	3.03	3.06	3.1	3.14	3.18	3.21	3.23	3.24	3.24	
	10	3.08	3.18	3.21	3.24	3.28	3.32	3.37	3.4	3.42	3.43	3.43	
	20	3.66	3.77	3.8	3.84	3.89	3.94	3.99	4.03	4.06	4.07	4.07	
	30	4.23	4.36	4.4	4.44	4.50	4.56	4.62	4.66	4.69	4.71	4.71	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20							1.49	1.23	0.96	0.7	0.44	
	-10	3.24	3.2	3.19	3.02	2.75	2.39	2.03	1.67	1.31	0.95	0.59	
EWT-LWT 40-45	-7	3.5	3.45	3.44	3.26	2.97	2.58	2.19	1.8	1.41	1.02	0.64	
	-5	3.67	3.62	3.61	3.42	3.11	2.71	2.3	1.89	1.48	1.07	0.67	
	-3	3.84	3.79	3.77	3.58	3.26	2.83	2.41	1.98	1.55	1.13	0.7	
	0	4.10	4.05	4.03	3.82	3.47	3.02	2.57	2.11	1.65	1.2	0.75	
	2	4.31	4.26	4.24	4.02	3.7	3.18	2.7	2.22	1.74	1.26	0.79	
	7	6.04	5.8	5.72	5.43	4.94	4.29	3.65	3.00	2.35	1.71	1.06	
	10	6.49	6.24	6.15	5.84	5.31	4.62	3.92	3.22	2.53	1.83	1.14	
	20	8.00	7.69	7.58	7.19	6.54	5.69	4.83	3.97	3.11	2.26	1.41	
	30	9.51	9.14	9.01	8.55	7.77	6.76	5.74	4.72	3.7	2.69	1.68	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20								1.63	1.64	1.64	1.64	
	-10	1.75	1.81	1.82	1.84	1.86	1.89	1.92	1.93	1.94	1.95	1.95	
EWT-LWT 50-55	-7	1.85	1.9	1.92	1.94	1.97	1.99	2.02	2.04	2.05	2.06	2.06	
	-5	1.91	1.97	1.99	2.01	2.04	2.06	2.09	2.11	2.12	2.13	2.13	
	-3	1.97	2.04	2.06	2.08	2.10	2.13	2.16	2.18	2.19	2.2	2.2	
	0	2.07	2.14	2.16	2.18	2.21	2.24	2.27	2.29	2.3	2.31	2.31	
	2	2.20	2.26	2.28	2.31	2.34	2.37	2.4	2.42	2.44	2.44	2.44	
	7	2.53	2.58	2.6	2.62	2.66	2.69	2.73	2.76	2.77	2.78	2.78	
	10	2.72	2.72	2.74	2.76	2.8	2.84	2.88	2.9	2.92	2.93	2.93	
	20	3.23	3.23	3.23	3.23	3.28	3.32	3.36	3.4	3.42	3.43	3.43	
	30	3.7	3.7	3.7	3.7	3.75	3.80	3.85	3.89	3.91	3.92	3.92	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20								1.22	0.96	0.7	0.44	
	-10	3.09	3.05	3.03	2.88	2.62	2.28	1.93	1.59	1.25	0.9	0.56	
EWT-LWT 50-55	-7	3.33	3.28	3.27	3.1	2.82	2.45	2.08	1.71	1.34	0.97	0.61	
	-5	3.54	3.49	3.48	3.30	3.00	2.61	2.22	1.82	1.43	1.04	0.65	
	-3	3.75	3.70	3.69	3.5	3.18	2.77	2.35	1.93	1.51	1.1	0.69	
	0	4.07	4.02	4.00	3.8	3.45	3.00	2.55	2.1	1.64	1.19	0.74	
	2	4.28	4.23	4.21	3.99	3.63	3.16	2.68	2.21	1.73	1.25	0.78	
	7	5.81	5.58	5.50	5.22	4.74	4.13	3.5	2.88	2.26	1.64	1.02	
	10	5.98	5.98	5.9	5.6	5.09	4.43	3.76	3.09	2.42	1.76	1.1	
	20	6.87	6.87	6.87	6.87	6.24	5.43	4.61	3.79	2.97	2.16	1.35	
	30	8.05	8.05	8.05	8.05	7.39	6.44	5.46	4.49	3.52	2.55	1.6	
	OAT												

COP		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20												
	-10	1.54	1.58	1.6	1.61	1.63	1.65	1.68	1.69	1.70	1.71	1.71	
EWT-LWT 50-60	-7	1.62	1.67	1.69	1.7	1.72	1.75	1.77	1.79	1.8	1.8	1.8	
	-5	1.68	1.73	1.74	1.76	1.78	1.81	1.83	1.85	1.86	1.87	1.87	
	-3	1.73	1.78	1.80	1.82	1.84	1.87	1.89	1.91	1.92	1.93	1.93	
	0	1.82	1.87	1.89	1.91	1.93	1.96	1.98	2.00	2.02	2.02	2.02	
	2	1.92	1.97	1.99	2.01	2.04	2.06	2.09	2.11	2.12	2.13	2.13	
	7	2.23	2.23	2.25	2.27	2.3	2.33	2.36	2.39	2.4	2.41	2.41	
	10	2.37	2.37	2.37	2.39	2.42	2.45	2.49	2.51	2.52	2.53	2.53	
	20	2.79	2.79	2.79	2.79	2.82	2.86	2.9	2.93	2.94	2.95	2.96	
	30	3.18	3.18	3.18	3.18	3.23	3.27	3.31	3.34	3.36	3.38	3.38	
	OAT												

CAPACITY		115%	105%	100%	90%	80%	70%	60%	50%	40%	30%	15%	Hz
6 kW Unit	-20												
	-10	2.74	2.72	2.72	2.58	2.34	2.04	1.73	1.46	1.15	0.83	0.52	
EWT-LWT 50-60	-7	3.06	3.02	3.01	2.85	2.59	2.26	1.91	1.57	1.23	0.9	0.56	
	-5	3.27	3.22	3.2	3.03	2.76	2.4	2.04	1.68	1.31	0.95	0.6	
	-3	3.48	3.41	3.39	3.22	2.92	2.55	2.16	1.78	1.39	1.01	0.63	
	0	3.80	3.71	3.68	3.49	3.17	2.76	2.34	1.93	1.51	1.1	0.68	
	2	4.01	3.91	3.87	3.67	3.34	2.91	2.47	2.03	1.59	1.15	0.72	
	7	5.07	5.07	5.00	4.74	4.31	3.75	3.19	2.62	2.05	1.49	0.93	
	10	5.32	5.32	5.32	5.05	4.59	3.99	3.39	2.79	2.18	1.59	0.99	
	20	6.07	6.07	6.07	6.07	5.51	4.8	4.07	3.35	2.62	1.91	1.19	
	30	7.00	7.00	7.00	7.00	6.44	5.60	4.76	3.91	3.06	2.22	1.39	
	OAT												

Rating Tables

COP		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20						2.03	2.04	2.06	2.06	2.06	
	-10	2.07	2.3	2.47	2.53	2.55	2.59	2.61	2.63	2.64	2.64	
EWT-LWT 30-35	-7	2.21	2.45	2.63	2.69	2.72	2.76	2.78	2.8	2.81	2.81	
	-5	2.32	2.55	2.72	2.79	2.81	2.87	2.9	2.92	2.92	2.93	
	-3	2.43	2.64	2.81	2.88	2.91	2.98	3.01	3.03	3.04	3.04	
	0	2.60	2.79	2.94	3.02	3.05	3.15	3.18	3.2	3.21	3.21	
	2	2.64	2.84	2.99	3.07	3.1	3.21	3.24	3.25	3.26	3.27	
	7	3.44	3.7	3.9	4.00	4.04	4.1	4.13	4.16	4.17	4.17	
	10	3.76	4.04	4.26	4.37	4.41	4.47	4.51	4.54	4.55	4.56	
	20	4.81	5.18	5.46	5.59	5.65	5.73	5.78	5.82	5.83	5.84	
	30	6.66	6.66	6.66	6.82	6.89	6.99	7.05	7.1	7.11	7.12	
	OAT											

CAPACITY		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20						1.91	1.57	1.23	0.9	0.56	
	-10	3.98	3.93	3.9	3.36	2.93	2.48	2.04	1.6	1.16	0.73	
EWT-LWT 30-35	-7	4.28	4.23	4.2	3.62	3.15	2.68	2.20	1.72	1.25	0.78	
	-5	4.56	4.5	4.47	3.86	3.35	2.85	2.34	1.84	1.33	0.83	
	-3	4.83	4.77	4.74	4.09	3.56	3.02	2.48	1.95	1.41	0.88	
	0	5.24	5.18	5.14	4.44	3.86	3.28	2.69	2.11	1.53	0.96	
	2	5.52	5.45	5.41	4.67	4.06	3.45	2.83	2.22	1.61	1.01	
	7	8.00	7.59	7.20	6.21	5.4	4.59	3.77	2.96	2.15	1.34	
	10	8.69	8.24	7.82	6.74	5.87	4.98	4.09	3.21	2.33	1.46	
	20	10.97	10.41	9.87	8.52	7.41	6.29	5.17	4.05	2.94	1.84	
	30	11.93	11.93	11.93	10.29	8.96	7.60	6.25	4.90	3.56	2.22	
	OAT											

COP		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20								1.86	1.87	1.87	
	-10	1.75	2.00	2.11	2.22	2.24	2.27	2.29	2.31	2.31	2.31	
EWT-LWT 40-45	-7	1.85	2.11	2.23	2.34	2.37	2.4	2.42	2.44	2.44	2.45	
	-5	1.9	2.16	2.29	2.37	2.4	2.43	2.45	2.47	2.47	2.48	
	-3	1.94	2.21	2.34	2.4	2.43	2.46	2.48	2.5	2.5	2.51	
	0	2.01	2.28	2.42	2.44	2.47	2.5	2.53	2.54	2.55	2.55	
	2	2.11	2.41	2.55	2.57	2.6	2.64	2.66	2.68	2.68	2.69	
	7	2.84	3.05	3.16	3.3	3.34	3.38	3.41	3.43	3.44	3.45	
	10	3.08	3.32	3.44	3.58	3.62	3.67	3.71	3.73	3.74	3.74	
	20	3.89	4.19	4.34	4.53	4.57	4.64	4.68	4.71	4.72	4.73	
	30	5.24	5.24	5.24	5.47	5.53	5.60	5.66	5.69	5.7	5.71	
	OAT											

CAPACITY		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20								1.25	0.91	0.57	
	-10	3.98	3.93	3.91	3.37	2.93	2.49	2.04	1.6	1.16	0.73	
EWT-LWT 40-45	-7	4.25	4.2	4.18	3.6	3.13	2.66	2.18	1.71	1.24	0.78	
	-5	4.52	4.47	4.44	3.83	3.32	2.83	2.32	1.82	1.32	0.83	
	-3	4.80	4.74	4.71	4.06	3.51	3.00	2.46	1.93	1.4	0.88	
	0	5.20	5.14	5.11	4.4	3.8	3.25	2.67	2.09	1.52	0.95	
	2	5.48	5.41	5.38	4.63	3.85	3.42	2.81	2.20	1.6	1.00	
	7	8.05	7.64	7.40	6.25	5.44	4.62	3.8	2.98	2.16	1.35	
	10	8.73	8.29	8.03	6.78	5.9	5.01	4.12	3.23	2.34	1.46	
	20	11.01	10.44	10.12	8.55	7.44	6.31	5.19	4.07	2.95	1.84	
	30	12.21	12.21	12.21	10.31	8.97	7.61	6.26	4.91	3.56	2.22	
	OAT											

COP		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20											
	-10		1.95	1.95	1.95	1.95	1.95	1.96	1.98	1.98	1.98	
EWT-LWT 50-55	-7	1.65	1.82	1.96	2.01	2.03	2.05	2.07	2.09	2.09	2.09	
	-5	1.7	1.89	2.03	2.08	2.1	2.13	2.15	2.16	2.16	2.17	
	-3	1.76	1.95	2.09	2.15	2.17	2.2	2.22	2.23	2.24	2.24	
	0	1.85	2.05	2.2	2.25	2.28	2.31	2.33	2.34	2.35	2.35	
	2	2.00	2.19	2.34	2.39	2.42	2.45	2.48	2.49	2.5	2.5	
	7	2.36	2.54	2.68	2.75	2.78	2.81	2.84	2.86	2.86	2.87	
	10	2.53	2.72	2.87	2.94	2.97	3.01	3.04	3.06	3.06	3.07	
	20	3.08	3.31	3.49	3.58	3.61	3.66	3.7	3.72	3.73	3.73	
	30	4.11	4.11	4.11	4.21	4.26	4.32	4.36	4.38	4.39	4.4	
	OAT											

CAPACITY		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20											
	-10		2.36	2.36	2.36	2.36	2.36	1.94	1.52	1.10	0.69	
EWT-LWT 50-55	-7	4.07	4.02	3.99	3.44	2.99	2.54	2.09	1.64	1.19	0.74	
	-5	4.33	4.27	4.24	3.66	3.18	2.7	2.22	1.74	1.26	0.79	
	-3	4.59	4.53	4.5	3.88	3.38	2.87	2.36	1.85	1.34	0.84	
	0	4.98	4.92	4.88	4.21	3.66	3.11	2.56	2.00	1.45	0.91	
	2	5.24	5.17	5.14	4.43	3.86	3.27	2.69	2.11	1.53	0.96	
	7	7.46	7.07	6.71	5.79	5.04	4.28	3.51	2.76	2.00	1.25	
	10	8.05	7.64	7.25	6.25	5.44	4.62	3.8	2.98	2.16	1.35	
	20	10.05	9.54	9.05	7.8	6.79	5.76	4.74	3.71	2.70	1.68	
	30	10.84	10.84	10.84	9.35	8.14	6.91	5.68	4.45	3.23	2.02	
	OAT											

COP		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20											
	-10	1.47	1.47	1.47	1.47	1.47	1.47	1.48	1.49	1.50	1.5	
EWT-LWT 50-60	-7	1.55	1.55	1.55	1.55	1.55	1.55	1.57	1.58	1.58	1.58	
	-5	1.61	1.61	1.61	1.61	1.61	1.61	1.62	1.63	1.63	1.64	
	-3	1.66	1.66	1.66	1.66	1.66	1.66	1.68	1.69	1.69	1.69	
	0	1.74	1.74	1.74	1.74	1.74	1.74	1.76	1.77	1.77	1.78	
	2	1.85	1.85	1.85	1.85	1.85	1.85	1.86	1.87	1.88	1.88	
	7	2.1	2.1	2.1	2.1	2.1	2.1	2.12	2.13	2.14	2.14	
	10	2.24	2.24	2.24	2.24	2.24	2.24	2.26	2.27	2.27	2.28	
	20	2.69	2.69	2.69	2.69	2.69	2.69	2.71	2.73	2.73	2.74	
	30	3.14	3.14	3.14	3.14	3.14	3.14	3.16	3.18	3.19	3.19	
	OAT											

CAPACITY		125%	105%	100%	90%	80%	70%	50%	40%	30%	15%	Hz
8 kW Unit	-20											
	-10	2.01	2.01	2.01	2.01	2.01	2.01	1.65	1.29	0.94	0.59	
EWT-LWT 50-60	-7	2.22	2.22	2.22	2.22	2.22	2.22	1.83	1.43	1.04	0.65	
	-5	2.36	2.36	2.36	2.36	2.36	2.36	1.94	1.52	1.11	0.69	
	-3	2.51	2.51	2.51	2.51	2.51	2.51	2.06	1.61	1.17	0.73	
	0	2.72	2.72	2.72	2.72	2.72	2.72	2.24	1.75	1.27	0.79	
	2	2.86	2.86	2.86	2.86	2.86	2.86	2.35	1.84	1.34	0.84	
	7	3.7	3.7	3.70	3.7	3.7	3.7	3.04	2.38	1.73	1.08	
	10	3.95	3.95	3.95	3.95	3.95	3.95	3.25	2.55	1.85	1.15	
	20	4.81	4.81	4.81	4.81	4.81	4.81	3.95	3.1	2.25	1.41	
	30	5.67	5.67	5.67	5.67	5.67	5.67	4.66	3.65	2.65	1.66	
	OAT											

Rating Tables

COP		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20						1.48	1.48	
	-10	2.26	2.27	2.28	2.29	2.31	2.31	2.31	
EWT-LWT 30-35	-7	2.5	2.52	2.52	2.54	2.56	2.56	2.56	
	-5	2.66	2.68	2.69	2.71	2.72	2.73	2.73	
	-3	2.83	2.84	2.85	2.87	2.89	2.89	2.9	
	0	2.97	2.99	3	3.0	3.04	3.05	3.05	
	2	3.08	3.1	3.11	3.13	3.15	3.15	3.16	
	7	3.86	3.89	3.9	3.93	3.95	3.96	3.96	
	10	4.26	4.29	4.3	4.33	4.35	4.36	4.37	
	20	5.58	5.62	5.63	5.67	5.7	5.72	5.72	
	30	6.9	6.95	6.97	7.01	7.05	7.07	7.08	
	OAT								

CAPACITY		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20	0	0	0	0	0	2.41	1.5	
	-10	7.28	6.68	6.44	5.49	4.3	3.12	1.95	
EWT-LWT 30-35	-7	7.85	7.2	6.94	5.92	4.64	3.37	2.10	
	-5	8.35	7.66	7.39	6.30	4.94	3.58	2.24	
	-3	8.85	8.12	7.83	6.68	5.23	3.8	2.37	
	0	9.61	8.82	8.5	7.24	5.68	4.12	2.57	
	2	10.11	9	8.75	7.62	5.98	4.34	2.87	
	7	13.45	12.34	11.90	10.15	7.95	5.77	3.61	
	10	14.61	13.4	12.92	11.01	8.63	6.27	3.91	
	20	18.45	16.93	16.32	13.91	10.91	7.92	4.94	
	30	22.3	20.46	19.72	16.81	13.18	9.57	5.97	
	OAT								

COP		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20						1.84	1.84	
	-10	2.08	2.1	2.1	2.12	2.13	2.14	2.14	
EWT-LWT 40-45	-7	2.17	2.19	2.19	2.21	2.22	2.22	2.23	
	-5	2.23	2.24	2.25	2.26	2.28	2.28	2.29	
	-3	2.29	2.30	2.31	2.32	2.34	2.34	2.34	
	0	2.40	2.42	2.42	2.44	2.45	2.46	2.46	
	2	2.57	2.6	2.61	2.63	2.64	2.64	2.67	
	7	3	3.02	3.03	3.05	3.07	3.07	3.08	
	10	3.18	3.2	3.21	3.23	3.25	3.26	3.26	
	20	3.77	3.79	3.8	3.83	3.85	3.86	3.86	
	30	4.36	4.39	4.4	4.43	4.45	4.46	4.47	
	OAT								

CAPACITY		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20						1.96	1.23	
	-10	6.82	6.26	6.04	5.15	4.03	2.93	1.83	
EWT-LWT 40-45	-7	7.5	6.88	6.63	5.66	4.43	3.22	2.01	
	-5	7.95	7.29	7.03	5.99	4.7	3.41	2.13	
	-3	8.40	7.71	7.43	6.33	4.97	3.6	2.25	
	0	9.12	8.36	8.06	6.87	5.39	3.91	2.44	
	2	9.59	8.9	8.48	7.23	5.67	4.12	2.74	
	7	12.95	11.88	11.45	9.76	7.65	5.56	3.47	
	10	13.92	12.77	12.31	10.5	8.23	5.97	3.73	
	20	17.16	15.74	15.18	12.94	10.14	7.36	4.6	
	30	20.4	18.71	18.04	15.38	12.06	8.75	5.47	
	OAT								

COP		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20								
	-10	1.66	1.67	1.67	1.68	1.69	1.69	1.69	
EWT-LWT 50-55	-7	1.78	1.79	1.8	1.81	1.82	1.82	1.83	
	-5	1.87	1.88	1.89	1.9	1.91	1.92	1.92	
	-3	1.96	1.97	1.98	1.99	2.00	2.01	2.01	
	0	2.06	2.07	2.08	2.09	2.1	2.11	2.11	
	2	2.18	2.19	2.2	2.21	2.22	2.23	2.23	
	7	2.48	2.49	2.5	2.52	2.53	2.54	2.54	
	10	2.63	2.63	2.63	2.65	2.67	2.67	2.68	
	20	3.08	3.08	3.08	3.1	3.12	3.13	3.13	
	30	3.53	3.53	3.53	3.55	3.57	3.58	3.58	
	OAT								

CAPACITY		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20								
	-10	6.29	5.77	5.56	4.74	3.71	2.7	1.69	
EWT-LWT 50-55	-7	7.2	6.61	6.37	5.43	4.26	3.09	1.93	
	-5	7.81	7.16	6.9	5.89	4.61	3.35	2.09	
	-3	8.41	7.72	7.44	6.34	4.97	3.61	2.25	
	0	9.13	8.37	8.07	6.88	5.4	3.92	2.45	
	2	9.61	8.81	8.5	7.24	5.68	4.12	2.71	
	7	12	11.51	11.10	9.46	7.42	5.38	3.36	
	10	12.35	12.35	11.91	10.15	7.96	5.78	3.61	
	20	14.6	14.6	14.6	12.45	9.76	7.08	4.42	
	30	17.3	17.3	17.3	14.75	11.56	8.39	5.24	
	OAT								

COP		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20								
	-10	1.47	1.48	1.48	1.49	1.5	1.5	1.51	
EWT-LWT 50-60	-7	1.55	1.56	1.56	1.57	1.58	1.59	1.59	
	-5	1.6	1.61	1.62	1.63	1.64	1.64	1.64	
	-3	1.66	1.67	1.67	1.68	1.69	1.7	1.7	
	0	1.74	1.75	1.75	1.77	1.78	1.78	1.78	
	2	1.83	1.84	1.85	1.86	1.87	1.88	1.88	
	7	2.08	2.08	2.09	2.1	2.11	2.12	2.12	
	10	2.2	2.2	2.2	2.21	2.23	2.23	2.23	
	20	2.56	2.56	2.56	2.58	2.59	2.6	2.6	
	30	2.95	2.95	2.95	2.95	2.96	2.97	2.98	
	OAT								

CAPACITY		115%	105%	100%	85%	65%	45%	25%	Hz
12 kW Unit	-20								
	-10	6.26	5.74	5.53	4.72	3.7	2.68	1.68	
EWT-LWT 50-60	-7	6.92	6.35	6.12	5.22	4.09	2.97	1.85	
	-5	7.37	6.76	6.51	5.55	4.35	3.16	1.97	
	-3	7.81	7.16	6.91	5.89	4.62	3.35	2.09	
	0	8.47	7.77	7.49	6.39	5.01	3.64	2.27	
	2	8.92	8.18	7.89	6.72	5.27	3.83	2.5	
	7	11	10.57	10.19	8.68	6.81	4.94	3.09	
	10	11.25	11.25	10.84	9.24	7.24	5.26	3.28	
	20	11.6	11.6	11.6	11.1	8.7	6.32	3.95	
	30	11.70	11.70	11.70	11.70	10.16	7.38	4.61	
	OAT								

Rating Tables

COP		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20						1.92	1.93	1.94	
	-10	2.33	2.35	2.36	2.39	2.4	2.41	2.42	2.42	
EWT-LWT 30-35	-7	2.47	2.49	2.5	2.53	2.55	2.56	2.56	2.57	
	-5	2.62	2.64	2.65	2.69	2.7	2.72	2.72	2.72	
	-3	2.78	2.79	2.81	2.84	2.86	2.87	2.88	2.88	
	0	3.00	3.02	3.04	3.08	3.1	3.11	3.11	3.12	
	2	3.16	3.18	3.2	3.24	3.26	3.27	3.28	3.28	
	7	4.01	4.04	4.06	4.11	4.14	4.15	4.16	4.17	
	10	4.42	4.45	4.48	4.53	4.56	4.58	4.59	4.59	
	20	5.8	5.83	5.87	5.94	5.98	6	6.01	6.02	
	30	7.17	7.22	7.25	7.34	7.39	7.42	7.44	7.44	
	OAT									

CAPACITY		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20						3.05	2.12	1.26	
	-10	8.44	7.89	7.42	6.2	5.03	3.88	2.75	1.63	
EWT-LWT 30-35	-7	9.1	8.5	8.00	6.68	5.42	4.18	2.96	1.76	
	-5	9.66	9.02	8.49	7.09	5.75	4.44	3.15	1.86	
	-3	10.21	9.54	8.98	7.5	6.08	4.7	3.33	1.97	
	0	11.05	10.32	9.71	8.11	6.58	5.08	3.60	2.13	
	2	12.07	11.06	10.2	8.4	6.91	5.33	3.84	2.45	
	7	16.49	15.41	14.50	12.11	9.82	7.58	5.37	3.18	
	10	17.91	16.74	15.74	13.15	10.66	8.23	5.83	3.46	
	20	22.62	21.14	19.89	16.61	13.47	10.4	7.37	4.37	
	30	27.33	25.54	24.03	20.07	16.27	12.57	8.9	5.28	
	OAT									

COP		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20							1.72	1.73	
	-10	2.06	2.07	2.08	2.11	2.12	2.13	2.13	2.14	
EWT-LWT 40-45	-7	2.17	2.19	2.2	2.23	2.24	2.25	2.26	2.26	
	-5	2.24	2.26	2.27	2.3	2.31	2.32	2.33	2.33	
	-3	2.31	2.33	2.34	2.37	2.38	2.39	2.4	2.4	
	0	2.42	2.43	2.44	2.47	2.49	2.5	2.51	2.51	
	2	2.56	2.58	2.6	2.65	2.66	2.67	2.68	2.71	
	7	3.17	3.19	3.21	3.25	3.27	3.28	3.29	3.29	
	10	3.36	3.38	3.4	3.44	3.46	3.48	3.48	3.49	
	20	3.99	4.01	4.03	4.08	4.11	4.12	4.13	4.14	
	30	4.63	4.64	4.66	4.72	4.75	4.77	4.78	4.78	
	OAT									

CAPACITY		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20							2.17	1.28	
	-10	8.52	7.97	7.49	6.26	5.07	3.92	2.78	1.65	
EWT-LWT 40-45	-7	9.1	8.5	8.00	6.68	5.42	4.18	2.96	1.76	
	-5	9.66	9.02	8.49	7.09	5.75	4.44	3.15	1.86	
	-3	10.21	9.54	8.98	7.5	6.08	4.70	3.33	1.97	
	0	11.05	10.32	9.71	8.11	6.58	5.08	3.60	2.13	
	2	11.43	10.76	10.2	8.52	6.91	5.33	3.84	2.47	
	7	15.92	14.88	14.00	11.69	9.48	7.32	5.19	3.07	
	10	17.12	16.00	15.05	12.57	10.19	7.87	5.58	3.30	
	20	20.35	19.72	18.55	15.49	12.56	9.7	6.87	4.07	
	30	23.63	22.97	21.8	18.42	14.93	11.53	8.17	4.84	
	OAT									

COP		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20									
	-10	1.74	1.75	1.76	1.77	1.79	1.8	1.8	1.8	
EWT-LWT 50-55	-7	1.83	1.84	1.85	1.87	1.89	1.89	1.9	1.9	
	-5	1.89	1.9	1.91	1.94	1.95	1.96	1.96	1.96	
	-3	1.96	1.97	1.98	2.00	2.02	2.02	2.03	2.03	
	0	2.05	2.06	2.08	2.1	2.11	2.12	2.13	2.13	
	2	2.17	2.18	2.2	2.22	2.24	2.25	2.25	2.25	
	7	2.54	2.54	2.55	2.56	2.57	2.58	2.58	2.58	
	10	2.63	2.63	2.64	2.67	2.68	2.7	2.7	2.7	
	20	3.09	3.09	3.09	3.12	3.14	3.15	3.16	3.16	
	30	3.55	3.55	3.55	3.57	3.59	3.61	3.62	3.62	
	OAT									

CAPACITY		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20									
	-10	7.94	7.42	6.98	5.83	4.73	3.65	2.59	1.53	
EWT-LWT 50-55	-7	8.55	7.99	7.52	6.28	5.09	3.93	2.79	1.65	
	-5	9.08	8.51	8.00	6.68	5.42	4.19	2.96	1.76	
	-3	9.61	9.02	8.48	7.09	5.74	4.44	3.14	1.86	
	0	10.40	9.79	9.21	7.69	6.23	4.82	3.41	2.02	
	2	11.02	10.3	9.69	8.09	6.56	5.07	3.64	2.30	
	7	12.96	12.4	11.93	10.49	8.57	6.62	4.69	2.78	
	10	13.41	13.41	12.7	11.34	9.2	7.10	5.03	2.98	
	20	15.76	15.76	15.76	13.91	11.28	8.71	6.17	3.66	
	30	18.1	18.1	18.1	16.06	13.36	10.32	7.31	4.33	
	OAT									

COP		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20									
	-10	1.53	1.53	1.54	1.56	1.57	1.58	1.58	1.58	
EWT-LWT 50-60	-7	1.61	1.62	1.63	1.65	1.66	1.67	1.67	1.67	
	-5	1.67	1.68	1.69	1.7	1.72	1.72	1.73	1.73	
	-3	1.74	1.74	1.75	1.76	1.77	1.78	1.78	1.79	
	0	1.82	1.83	1.84	1.85	1.86	1.87	1.87	1.87	
	2	1.92	1.93	1.94	1.95	1.96	1.97	1.97	1.98	
	7	2.18	2.18	2.19	2.2	2.22	2.22	2.23	2.23	
	10	2.26	2.26	2.28	2.3	2.32	2.33	2.33	2.33	
	20	2.65	2.65	2.65	2.68	2.7	2.71	2.72	2.72	
	30	3.06	3.06	3.06	3.06	3.09	3.10	3.1	3.11	
	OAT									

CAPACITY		115%	110%	100%	85%	65%	50%	35%	15%	Hz
15 kW Unit	-20									
	-10	7.08	6.62	6.23	5.2	4.22	3.26	2.31	1.37	
EWT-LWT 50-60	-7	7.83	7.32	6.89	5.75	4.66	3.6	2.55	1.51	
	-5	8.25	7.79	7.33	6.12	4.96	3.83	2.72	1.61	
	-3	8.66	8.26	7.77	6.49	5.26	4.06	2.88	1.71	
	0	9.28	8.96	8.43	7.04	5.71	4.41	3.12	1.85	
	2	9.79	9.43	8.87	7.41	6.01	4.64	3.33	2.10	
	7	11.14	10.95	10.70	9.57	7.76	5.99	4.25	2.52	
	10	11.52	11.52	11.29	9.87	8.00	6.18	4.38	2.59	
	20	13.5	13.5	13.5	11.86	9.61	7.43	5.26	3.12	
	30	13.84	13.84	13.84	13.84	11.22	8.67	6.14	3.64	
	OAT									

Maintenance Sheet

Customer Name		Service Engineers Name	
Address		Company	
		Tel No	
		Site Number	
Tel No		Date of Inspection	
Model No.		Serial No.	

No	SYSTEM AND INSTALLATION STATUS	NOTES
1	INSTALLATION LOCATION	
2	MAINTENANCE AND ACCESS TO REMOVE COVERS	
3	SPACE AVAILABLE FOR AIR FLOW	
4	STANDARD OF PIPEWORK	
5	STANDARD OF INSULATION	
6	STANDARD OF ELECTRICAL INSTALLATION	
7	ACCESS TO REMOVE ELECTRICAL COVERS	
8	CONNECTION OF MAINS POWER SOURCE	
9	CONNECTION OF CONTROL WIRING	
10	ANTI-FREEZES ADDED TO SYSTEM	
11	CHECK AIR CHARGE IS IN EXPANSION VESSELS	
12	PRESSURISE PRIMARY CIRCUIT TO APPROXIMATELY 1.50 BAR	
13	RELEASE AIR FROM SYSTEM	
14	POWER SOURCE (v)	
15	VIBRATION / NOISE	
16	UNIT MOUNTED ON ANTI-VIBRATION PADS AND SECURELY FIXED	
17	PROVISIONS MADE FOR CONDENSATE REMOVAL	

NOTES AND COMMENTS

Maintenance Checklist

The Aeromax plus must be maintained on an annual basis. **The basic requirements are:**

External checks
Visually inspect all connecting pipework for any signs of leaks
Check the integrity of pipework insulation
Clean heat exchanger on rear of external unit

Inside the Heat Pump
Check all electrical connections for tightness
Visual inspection for either oil or water leaks
Check operation of unit with cover still removed

Cylinder
Albion AeroCyl and integral heat pump controls.

Customer Name		Service Enginners Name	
Address		Company	
		Tel No	
		Site Number	
Tel No		Date of Inspection	

Tasks	Frequency	Comments / Notes
1. With the water supply turned off, remove the screen from the strainer in the combination inlet valve and clean off any dirt	Annual Visit	
2. With the water supply turned off and the hot water taps open, check the expansion vessel charge pressure and top up as necessary	Annual Visit	
3. With the water supply turned on, open the temperature relief valve and then the expansion valve to check unrestricted discharge into tundish. Check valves for freedom of movement and confirm that the water stops and both valves reseat correctly. Check at a full bore discharge from either valve that there is no back up or discharge over the tundish.	Annual Visit	
4. Check that the correct outlet pressure is being maintained by the pressure reducing valve by recording the pressure at the terminal	Annual Visit	
5.Check and clean the heat pump circuit filter.	Annual Visit	
6.Open the primary/heating system safety valve and check that it discharges safely.	Annual Visit	
7.Check and if necessary top up the concentration of the heating system anti-freeze	Annual Visit	
8.Re-establish the primary/heating system pressure and disconnect the filling system.	Annual Visit	
9.Check the primary/heating system pressure does not rise above 2.5 bar and the safety valve does not drip when the system is at full temperature.	Annual Visit	
10. Check and release any air from the primary/heating systems.	Annual Visit	
11. Check correct rating and type of fuse is fitted on the electrical supply.	Annual Visit	
12. Check for the correct operation and temperature setting of the thermostats.	Annual Visit	
13. Check the operation of the motorised valves.	Annual Visit	

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Aeromax Plus Pre Commissioning Report and Checklist

Site Address			
Installing Contractor			
Size/Model of Heat Pump			
Circulating pump size		Commissioning Date	
Make/Model of Cylinder		Serial Number	

Heat Pump Installation

Outdoor unit location correct (see manual)*	Yes		No	
Base plate knockouts removed (see manual)*	Yes		No	
Provision made for condensate removal*	Yes		No	
Anti-vibration pads fitted*	Yes		No	
Unit correctly secured to base*	Yes		No	
Comfort Module installed*	Yes		No	
Back-up heater installed (Bi-valent parallel system)*	Yes		No	
Boiler installed (Bi-valent alternative system)*	Yes		No	

Plumbing Installation

Flexible hoses installed*	Yes		No				
Flow and return connected correctly (R top and F Bottom)*	Yes		No				
Isolation valves installed externally*	Yes		No				
External Pipework Insulated.*	Yes		No				
Flush and fill ports installed*	Yes		No				
Danfoss W Plan valve installed (Port A to Hot Water)*	Yes		No				
Circulating pump installed on return*	Yes		No				
System filter installed on return*	Yes		No				
Flow setter fitted on return.*	Yes		No				
Auto Air vent fitted at highest point.*	Yes		No				
Is the system fitted a bivalent one*	Yes		No				
Heat emitter type *	Underfloor		Radiators		Fan coils		Ufloor + radiators	

Electrical Installation

Electrical isolation switch fitted adjacent to heat pump*	Yes		No	
Electrical isolation switch rating*				Amp
MCB/Fuse rating				Amp
Link wire installed between terminals 3 & 7 on outdoor unit*†	Yes		No	
Danfoss FP715 Hot Water programmer fitted*	Yes		No	
Cylinder Thermostat fitted*	Yes		No	
Danfoss TP5000 room stat fitted*	Yes		No	
Kingspan diagnostic indicator fitted*†	Yes		No	
Kingspan Advanced Controller (NUI) fitted (Optional).*†	Yes		No	

Commissioning

System flushed with cleanser*	Yes		No	
System checked for leaks*	Yes		No	
Antifreeze added to system… concentration level. *	Yes		No	
Air removed from primary circuit*	Yes		No	
Pump operating*	Yes		No	
Diverter valve operating*	Yes		No	
Aeromax Plus operating*	Yes		No	
Selected heat curve (enter 1 – 12 or custom)(default = 9)†				
What is the flow rate set to				LPM
Record Flow Temperature				℃
Record Return Temperature				℃
Record outdoor air temperature				℃
What is the bivalent point (OAT that boiler is turned on at)				℃

*Delete as required † Not applicable if Comfort Module installed - see Comfort Module commissioning sheet

Notes

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